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8 October 1982

# Worldwide Report

NUCLEAR DEVELOPMENT AND PROLIFERATION

No. 165

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# FIRST RANGER URANIUM LEAVES FOR JAPAN, VIA U.S.

## Japanese Purchases

Canberra THE AUSTRALIAN in English 3 Aug 82 p 14

[Article by Alan Goodall]

[Text] THE first shipment of Ranger uranium bought by Japan for processing in the United States is expected to leave Darwin later this month.

Diplomatic notes sanctioning the first export under a new Australia-Japan Nuclear Safeguards Agreement are due to be exchanged this week.

The long-awaited note exchange, probably taking place in Canberra, will allow the start of shipments of a contracted 16,000 tonnes of yellowcake until 1996.

This year's exports, 750 tonnes of high grade U308, will be converted in the US into enriched uranium.

The Japanese Foreign Minister, Mr Sakurachi, is understood to have told his Australian counterpart, Mr Street, in Canberra last week that the Japanese Diet had ratified the stricter nuclear safeguards pact signed in March.

Mr Sakurachi is due back in Tokyo on Wednesday for a Cabinet meeting on Friday.

It is thought the diplomatic notes will not be exchanged until after Cabinet discussion.

But the director of the Japan-Australia Uranium Resources Development Co, Mr Masao Takaya, said further Cabinet approval was unnecessary.

Energy Resources of Australia, operator of the Northern Territory uranium mine, has contracted with the buyer, Japan-Australia Uranium Resources Development Co, to make four shipments a year.

But because of the delay in getting approval from the Australian and Japanese governments, this year's shipment may go in one or two lots.

Japan will take 30 per cent of Ranger production this year and the next.

The ERA consortium plans to lift yellowcake production to 3000 tonnes in 1984, rising 1000 tonnes a year to 1996.

Yellowcake will also go to West Germany, where companies hold 14 per cent of ERA

equity, and Sweden, holding 1 per cent.

The Japanese consortium holds a 10 per cent equity.

The Ranger deposit, 250km east of Darwin, has been confirmed to hold 140,000 tonnes. Grade is a high 0.3 per cent.

## Protests

The Ranger breakthrough will signal a new phase in Japanese use of Australian uranium for its revised nuclear power program.

The world's third largest nuclear power producer plans to boost uranium imports, basing half its future increase in electricity generation on uranium.

The 16 million kilowatt annual production now generated from 23 commercial reactors is at a standstill following protests from Japanese environmentalists.

But the Government's determination to press ahead with nuclear power is evident in recent approvals for enrichment plants to help complete a self-sustaining nuclear fuel cycle.

## Effect on Tokyo Ties

Sydney THE SYDNEY MORNING HERALD in English 5 Aug 82 p 12

[Article by Hamish McDonald]

[Excerpt] TOKYO, Wednesday. — The movement of a small cargo ship between Port

Moresby, Darwin and Singapore later this month will signify a sharp tightening of

## Australia's relationship with Japan.

On its call into Darwin on August 15 the ship will load drums containing 500 short tonnes of uranium oxide, or yellowcake. The cargo will be transhipped in Singapore and sent to the US.

The companies allied Chemical and Kerr-McGhee will convert the yellowcake into uranium hexafluoride before it is enriched and made into nuclear fuel rods. Many months later it will be on its way to Japanese nuclear power stations.

The shipment will be the first made to Japan under contracts concluded after the 1976-77 Ranger inquiry, which led to a new safeguards policy on Australian uranium exports.

Coming from the Ranger mine itself, the shipment will earn the mine owners, Energy Resources of Australia an estimated \$US38 million — the foretaste of billion dollar-plus earnings over a 15-year contract with Japan.

Four years after negotiations on a Japan-Australia safeguards treaty began, officials in Tokyo are still clearing up final details to enable the Ranger exports to proceed.

The treaty was ratified by the Japanese Diet (Parliament) last month, but still has to be endorsed by Cabinet within the next few days to come into effect.

Australian officials are also still waiting on an inventory of Japan's nuclear fuel stocks so that the complex accounting of uranium use required by the treaty can begin.

While talking with Japan, Australia concluded nine other safeguards treaties. But the drawn-out negotiations, which saw a significant easing of policy to

allow "program" approvals for uranium use, have now re-opened Australia's shop window to its best customers, despite anti-nuclear stirrings.

Japan's nuclear fuel needs are met for about eight years by existing supply contracts, mostly funnelled through enrichment plants in the US and France. But nuclear plans for the 1990s hold prospects of many times the Ranger earnings.

"Only France, the Soviet Union and Japan are still promoting nuclear energy," Mr. Kasuhisa Mori, chief executive of the Japan Atomic Industrial Forum, a major lobby here said. "Other countries are just throwing away their nuclear programs."

Like other close relationships, the position of uranium supplier brings a loss of freedom. Japanese power companies watched with intense interest the Australian Labor Party conference in June, which modified policy to allow existing uranium export contracts to be fulfilled.

The relief at the change is still not quite unalloyed. "Most of the Japanese power industry grasp the Australian situation pretty well," said one industry leader, who asked not to be named. "But I still have doubts about the Labor Party if it takes power. Since about the possibility of policy changes."

"Australia has to grow up, to have a relationship as an adult — with Japan or any other country. A mature relationship."

Trade officials here warn that if contracts were dishonoured, the effects would be felt not just in the uranium mining industry.

"Iron ore, coal — you name it" one Australian source said.

# U.S. PROCESS THREATENS AUSTRALIAN URANIUM ENRICHMENT DRIVE

Canberra THE AUSTRALIAN (in English) 23 Aug 52 p 1

[Article by Nicholas Rothwell]

[Text]

THE AUSTRALIAN URANIUM enrichment drive has been threatened by the discovery of a new method of enriching uranium which has been patented by the U.S. Atomic Energy Commission.

A Nobel Prize-winning American physicist Professor Hans Bethe revealed that the laser isotope separation method of separating uranium for use in civilian nuclear reactors could operate four times as cheaply as the systems being considered for the Australian plant.

Four large resource development companies CSR, BHP, Anglo-Wallend and Western Mining Company last year formed the Uranium Enrichment Group of Australia to develop an enrichment plant.

The group has invested \$1 million in a feasibility study of the plant which would triple the value of local uranium ore on the export market by purifying it to a suitable grade for commercial power generation.

But the enrichment techniques under consideration for the plant, chemical diffusion or centrifuge processes,

are a long way from being commercially viable.

Various foreign countries including Japanese, French and American firms are working on a British-British group, Urenco-Centrex, have offered to supply the Australian consortium with enrichment equipment.

But the new American system discussed by Professor Bethe has drawn a sharp blow to rival enrichment methods.

Professor Bethe said the new enrichment system would reduce the cost of uranium enrichment to a fraction of the present cost of separating by means of the complicated high energy method of gaseous diffusion method.

The new U.S. technology should enter world markets by the beginning of the next decade.

Even if the Australian plant is chartered by Mr. Gerni Herbert of CSR makes an initial selection of techniques for the plant — and the process is already six months behind the original schedule — the plant would not compete with the foreign 1955 and 1956 and take strong drive with the new laser method.



# HUGE EXPORT DEALS IN OFFING FOR JABILUKA MINE URANIUM

## Price Controversy

Canberra THE AUSTRALIAN in English 3 Aug 82 pp 1, 30

[Article by Nicholas Rothwell and Des Keegan]

[Text]

THE company developing the Northern Territory's giant Jabiluka uranium mine is on the verge of initialling export contracts with big foreign customers despite gloomy reports about the economics of the project.

Pancontinental Mining officials said yesterday several foreign electricity utilities had already decided to reserve some cash in their budget projections to buy uranium from Jabiluka.

A Northern Territory Government inter-departmental document leaked to the press at the weekend, suggested that exports from the mine would be difficult to achieve because of an over-supply of uranium on the world market.

The eight-page report, prepared by the secretary of the Territory's Department of Mines and Energy, Mr Mike Purcell, suggested that prospects for large sales from Jabiluka were poor unless the Federal Government changes its price-fixing policies.

But yesterday the Federal Government dug its heels in on a \$30-a-pound minimum export price for new uranium contracts.

The Acting Minister for Trade and Resources, Mr Nixon, said the floor-price policy had wide support in the mining industry and the Government did not intend to change it at present.

Canberra sources saw the leaking of the Northern Territory document as a ploy to convince the Federal Government it will have to lower its minimum floor price, at least temporarily.

Yesterday Pancontinental's chairman, Mr Tony Grey, said prospects were "not gloomy" and "the very fact that we are negotiating with so many interested foreign utilities shows that we have an attractive product to sell".

It is understood that long-term contracts already signed or shortly to be concluded between foreign customers and local suppliers include sale prices well above the spot market level.

The controversy over Jabiluka's profitability hinges on the present depressed state of the uranium market (uranium oxide now sells for \$US22.70 a pound in spot sales) but long-term contracts, details of which are a commercial secret, involve sales at prices far higher than \$US30.

World consumption of yellowcake is running at about 33,000 tonnes, while annual output is 53,000 tonnes. These figures compare with projected exports for Jabiluka of 3000-4500 tonnes of uranium oxide a year.

But it will be at least 1986 by the time Jabiluka begins producing.

Only last week the Federal Government gave consent for the Northern Territory administration to issue a firm

mining lease for Jabiluka. Final details of the contract are now being concluded, with the formal signing of the document expected this week.

Pancontinental was authorised to offer Jabiluka uranium for sale to potential export customers last March, but the company has not been able to sign any firm contract without the benefit of a definite mining lease.

With the completion of the lease negotiations, Pancontinental is expected to announce agreements on the supply of nuclear fuel to several countries which have agreed to meet federal safeguards covering nuclear fuel.

Yesterday Mr Grey said he was confident his company would meet its expectations of exporting 3000 tonnes of uranium oxide, building to 4500 tonnes over two years.

Concern that uranium from the project may be sold at low prices are unfounded, since all the contracts now being negotiated for Jabiluka are based on long-term supply prices far above the spot price and these contain price adjustment mechanisms to take account of future economic conditions.

The Northern Territory Minister for Mines and Energy, Mr Tuxworth, whose own department is responsible for the predictions of economic difficulties for Jabiluka, has reaffirmed his belief that the project will be a success.

Nothing that has happened in the past day or two has changed the potential of Jabiluka," he said.

"This project will overcome any short-term economic problems because it is such a rich resource and because there is such a large supply of the material."

Pancontinental is known to be interested in supplying uranium oxide to the nuclear fuel industry now developing among members of the Association of South-East Asian Nations, and to European nations.

The leaked report on Jabiluka's economic prospects concluded that potential foreign customers for the mine included the nuclear industries of France, South Korea, Sweden and Taiwan.

But several other countries with nuclear industries are understood to have shown interest in the mine. These include Indonesia, the Philippines, the United States, Switzerland and Japan.

Although the leaked report discounts the possibility of the

mines exports going to Taiwan, South Korea or France, the document makes no mention of several confidential, high-level visits to this country by delegations from the nuclear industries of those nations.

In addition, senior Japanese and Swedish officials have visited both Sydney and the Northern Territory recently to discuss possible sales.

Some potential customers have yet to negotiate a nuclear safeguards agreement with this country, but one nation which has, the United Kingdom, has recently confirmed that it plans to double its purchases of local yellowcake.

Australia and Egypt are expected to sign a nuclear safeguards and co-operation agreement before the end of the Budget session which begins in Federal Parliament on August 17.

Last week officials from both countries finalised a draft agreement in Canberra after only three days of talks.

But the officials said Australian uranium is unlikely to be sent to the Middle East before 1985.

Yesterday the row over uranium mining took a new twist when the Federal Opposition spokesman on Aboriginal affairs, Senator Susan Ryan, accused the Northern Territory Government of "a mischievous campaign."

She said: "Attempts by Northern Territory Government members or officials to blame Aboriginals for the poor prospects faced by the Jabiluka mine are unfounded."

"That the development of a huge uranium mine is of doubtful viability in current market conditions is a fact of economic life. World uranium prices have been on the slide for several years and I reject claims that the reasonable time taken to reach agreement between Aboriginal traditional owners and the Jabiluka developers has affected the viability of the mine."

The Northern Territory Government is engaged in a mischievous campaign to inextricably link development and progress in the Northern Territory with the demise of Aboriginal land rights," she said.

## Probe of Report Leak

Perth THE WEST AUSTRALIAN in English 3 Aug 82 p 23

[Text]

**DARWIN:** A police investigation has been launched in Darwin into the leaking of a Government report on the economic future of the proposed \$650 million Jabiluka mine.

The Chief Minister, Mr Everingham, said: "I believe that the theft of this document is an act of serious industrial espionage and I have referred the matter to the Police Commissioner."

Chief Inspector Colin Pope, of the Darwin CID, questioned the

Darwin correspondent of Australian Associated Press, Brian Johnstone, about the leaked report.

AAP reported on Sunday that the document was a status report

from the secretary of the N.T. Department of Mines and Energy, Mr Mike Purcell, to the Coordinator-General, Mr Ray McHenry. It questioned the prospect of the Jabiluka joint ventures — Pancontinental Mining and the Getty Oil Development Company —

securing long-term contracts for uranium unless the Federal Government dramatically lowered or abandoned its minimum-pricing policy on export sales.

Mr Everingham said that the document, which had been "leaked or stolen by some arm of the media," was a position paper prepared by the Mines Department for the coordination committee to enable gov-

ernment agencies to make preparations for Jabiluka going ahead.

Labor's Aboriginal Affairs spokesman, Senator Susan Ryan (A.C.T.) said in Canberra that attempts by Government members and officials to blame Aboriginals for the Jabiluka uranium mine's bleak future were unfounded.

A slump in world uranium prices had been responsible, she said.

## Official Lease Signing

Melbourne THE AGE in English 13 Aug 82 p 15

[Text]

A mineral lease for the development of the 307,400-tonne Jabluka uranium deposit was signed yesterday by the Northern Territory Minister for Mines and Energy, Mr Tuxworth.

The Jabluka partners, Pancontinental Mining Ltd, and Geniv Ore Development Co., who already have had wide ranging preliminary discussions with a number of overseas power utilities, can now begin their sales efforts in earnest.

Success with long-term contract negotiations could enable a start of construction by the beginning of the top end dry season next May, leading to production by the beginning of 1987 at an initial rate of about 300 tonnes a year, rising within a few years to 4500 tonnes.

Mr Tony Grey, chairman of Pancontinental, said yesterday: "We are optimistic about being able to secure sufficient contracts to get the project moving, and to give it a secure financial underpinning. We are actively in negotiation with a number of utilities at present."

He said that when Jabluka came into production in the latter part of this decade, demand for uranium was expected to be much greater than today, and worldwide supply could even be less.

Mr Grey said that the uranium oxide market could be roughly broken down into three main areas — Europe "the best target for the next few years", South-East Asia and the United States.

Despite the slowdown by some developments, and a reduction in forecast growth, the nuclear industry's rate of expansion was extremely large by virtually any industrial comparison. The present "world outside communist areas" reactor demand of 175 gigawatts was expected to expand two and a half times by 1990.

Japan's domestic needs were well covered by existing contracts up until 1990, but as that year approached the Japanese would be looking to securing additional supplies. They would have a great deal of interest in Jabluka.

"We consider Japan to be a very important market for us, mainly after 1990, although some utilities might be willing to take small tonnages before then," Mr Grey said.

"In Europe, there is a similar need for long-term assurances of supply, but their requirements are going to come in somewhat sooner than that. United States production of about 14,000 tonnes of uranium oxide a year is expected to be halved by 1990 because costs of most producers are too high to maintain output at the current level."

CSO: 5100/7552

FRENCH READY TO TAKE OVER

YACHTING CLUB OF AUSTRALIA

MELBOURNE, 24th

APRIL (AP) —

Text

PERTH — French interests are prepared to take over the Yacht Club of Australia in Western Australia as well as take some of its product.

It was confirmed yesterday that negotiations are taking place in the French nuclear industry which is owned by the French Government, for an equity stake in Yacht.

The French move gives new life to the \$150 million project which was threatened earlier this year when Esso announced it would withdraw.

It also comes at a time when some other uranium projects in Australia are getting serious orders.

The other partners in Yacht are Western Mining Corporation, with 25 per cent of the equity, and the German group, Bergbau, with 10 per cent.

WMC's executive director, Mr. Hugh Morgan, was cautious yesterday when asked about the French move. He said that the project was being made in a haste with a number of practical problems still in equity and in the hands of the French in a pilot plant. It is a satisfactory project, he said, but it is not yet in the hands of the French. He said that the project is still in the hands of the French and that it is not yet in the hands of the French.

## Diversify

The French have been diversifying their interests in Australia since 1960, Mr. Jones said. He noted that the French had taken an interest in the uranium industry and in the oil industry. He also noted that the French had taken an interest in the steel industry and in the shipbuilding industry. He said that the French had taken an interest in the Australian market for several years.

It is clear that the French are not interested in taking over the full 10 per cent of the project. They are interested in taking over the 10 per cent of the project which is owned by the French Government. They are interested in taking over the 10 per cent of the project which is owned by the French Government.

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## Physicists' Objections

Perth THE WEST AUSTRALIAN in English 11 Aug 82 p 1

[Article by Carl Kitchen]

[Text]

MELBOURNE: Two Australian physicists have called on the Federal Government to refuse to license any French interest in the Yeelirrie uranium project unless France stops nuclear testing in the Pacific.

Mr R. Robotham, a radiation protection officer at Melbourne University, and Dr D. Hutton, a senior lecturer in physics at Monash University, said that Australia's credibility with Pacific nations would be seriously undermined if the French nuclear industry became involved in the project.

Mr Robotham said that the WA Government should oppose any French investment in Yeelirrie.

In the event of a nuclear war the North West Cape communications base and Cockburn Sound would be targets.

Western Mining Corporation, the senior partner in the venture, has started talks with the French and, according to the firm, there is a possibility that the French will take up about 15 per cent equity in the project.

In a joint statement Mr Robotham and Mr

Hutton said that if France were permitted to become involved with Yeelirrie, Australia would be seen to be aiding the French nuclear weapons programme.

France had a record of irresponsibility in administering its nuclear-weapons policy and had not signed the nuclear non-proliferation treaty, they said.

In PERTH the WA Premier, Mr O'Connor, said that the Government would assess arrangements for the project when they were made.

At this stage the French were not involved, he said.

## Brisbane Enrichment Project

Brisbane THE COURIER-MAIL in English 3 Aug 82

[Article by Peter Morley]

[Text]

**FRENCH industrialists have told the Queensland Government that they are interested in establishing a uranium enrichment plant here.**

The French involvement was discussed yesterday in State Cabinet, which last week was told the Uranium Enrichment Group of Australia was assessing near-Brisbane sites for their suitability.

The UEG looked at areas around Caboolture and Ipswich that will be compared with South Australian and West Australian sites when a decision on a location is made later this year.

The Mines and Energy Minister, Mr Gibbs, revealed that the French were interested in establishing an enrichment plant during a report yesterday on his recent European trip.

He said the French Atomic Energy Commission regarded Queensland as a potential site for an enrichment plant, although it had not specified any locations in talks with him.

It would provide the technology for French companies willing to finance the project, particularly as the country already had interests in Queensland uranium mining.

### 'Might as well'

Outside Cabinet, Mr Gibbs said he supported the establishment of an enrichment industry — "We are exporting uranium now. We might as well

benefit from enriching it and then exporting it."

"It would be to Queensland's benefit if we could get this secondary process. The French are very keen on Queensland."

Mr Gibbs said rather than sites, probably the first question to be determined was the type of enrichment process to be used. The French had a chemical process and the Uranium Enrichment Group used gas centrifuge technology.

A decision on the technology would have to involve the Federal Government.

CSO: 5100/7553

# ALP'S SOFTENED NUCLEAR POLICY MEETS RESISTANCE

## Union Objection

Canberra THE AUSTRALIAN in English 4 Aug 82 p 1

[Article by Peter Terry]

[Text] THE powerful Australian Railways Union yesterday threatened to end its affiliation with the Labor Party and lead a new revolt against uranium mining and the ALP's revised policy for limited uranium development.

The threat came less than 24 hours after the Leader of the Opposition, Mr Hayden, had successfully warded off a move by the party's West Australian State executive to have the national conference reconvened to vote again on the uranium policy.

The main thrust of Mr Hayden's argument against the motion was that any show of party division would be exploited by the Fraser Government, and could spark an early election.

The ARU is the first union to suggest it might withdraw from the party over the issue but at least three other unions are known to be considering similar action.

At the same time there are motions before the South Australian, Queensland and Victorian ALP executives demanding that the national conference be reconvened.

But under ALP rules it will need the support of at least four State executives before such an extraordinary move can be made.

The ARU's threat is indicative of the anger among left-

wing union affiliates since the party's national conference voted on July 7 to allow existing uranium mines to continue development for another 25 years.

## Calculated

The change in ALP policy is in total opposition to that of the 50,000-member Railways Union which in April reaffirmed its decision not to handle ore from uranium mines.

It was the ARU and the Amalgamated Metal Workers and Shipwrights Union which on Tuesday night led the motion at the West Australian executive for reconvening the national conference.

Mr Hayden cut short his holiday on the Barrow Reef to fly to Perth to attend the meeting.

Before his decision to intervene was known both the ARU and the AMWSU had calculated that the motion would be passed with a significant majority.

The final vote was 54-82.

But the figures still gave a strong indication of the high feelings against the new policy within the West Australian executive.

The Opposition leader, Mr Burke, is known to be among those staunchly opposed to uranium mining.

He has already given an undertaking to the executive that if the ALP wins power at the next State elections, he will not permit development of

the proposed Yeelirrie uranium project, 750km north-east of Perth.

## Undemocratic

The split in union ranks is also threatening the party at branch level with some rank and file members suggesting they will resign over the issue.

"The issue has split the party here in Western Australia as well as in South Australia, Victoria and Queensland," said the ARU's vice president, Mr Chris Chadd.

Mr Chadd said he was well aware that the issue could be severely damaging to the party as it prepares for the federal election.

"It's a pity, because we want to see a Labor Government in 1984," said Mr Chadd.

"But they should have thought of that before they brought this up at the national conference."

"The only way to heal things now is to reconvene the conference and give the rank and file a say."

"If the rank and file had its say in the first place there would have been no change in the policy."

State branches of the ARU will meet in the coming weeks to decide whether to disaffiliate with the ALP.

The decision on any final breach will be taken at the union's national executive meeting in December.



## Western Rebellion

Melbourne THE AGE in English, Sat 31 p. 4

[Article by Michelle Watson]

[Text] CANBERRA. — The Opposition Leader, Mr Hayden, has helped head off moves within the ALP's West Australian branch to try to reverse the party's new softer uranium policy.

Mr Hayden flew to Perth on Monday to attend a special meeting of the State executive summoned to discuss the new policy which would allow a Federal Labor Government to fulfil existing uranium contracts.

A motion at the meeting calling for a special national conference to reconsider the policy was defeated 82 to 54 after a strong speech by Mr Hayden.

In Victoria, members of the Left and others who oppose the change in the uranium policy are organising opposition to it, including a protest meeting on 22 August in Collingwood town hall. The immediate past president of the ALP in Victoria, Mr Kevin

Hardiman, said yesterday the moves in Victoria are designed to see a reversal of the pre-mining resolution.

"The way to achieve that is to get an informed debate through the party so the rank and file can come up with its own policy." But he said there was no proposal being put in Victoria at present for a special national conference.

"The pre-mining resolution was imposed from above in an arbitrary way without any discussion," Mr Hardiman said.

Labor sources said yesterday that although the motion for a special national conference would have been defeated at Monday's Perth meeting without Mr Hayden's presence, he had ensured it was lost by a healthy majority.

The motion was moved by Mr Jim McKiernan, an official of the Amalgamated Metal Workers and Shipwrights' Union. Mr McKiernan was one of only two of the 11 WA delegates to last month's

national conference to vote against softening the policy. The new moderate policy was carried 50 to 46, and the vote of the nine WA delegates was crucial.

Monday's WA State executive did carry a resolution regretting that the rank and file of the party had not been given the opportunity to fully discuss the issue before the policy was changed.

Yesterday, Mr Hayden cast doubts on whether a Labor Government would allow the export of Yerrrie uranium to France. He said a Labor Government would require a condition from France that it cease testing nuclear weapons in the south-west Pacific before approving any export of uranium.

The WA Minister for Resources Development, Mr Jones, said on Monday that France was showing strong interest in the uranium. Later, Western Mining Corporation officials confirmed that talks had started.

CSO: 31.6.79

PROPOSED ISLAND NUCLEAR POWER STATION ATTACKED

Canberra THE AUSTRALIAN in English 3 Aug 82 p 2

[Text] A proposal by two Liberal senators to build a nuclear power station on a Bass Strait island has been slammed by conservationists.

The president of the Australian Conservation Foundation, Dr Geoff Mosley, said in Melbourne yesterday the suggestion by Senators Peter Rae and David Hamer to establish a nuclear power station on Clarke Island was "totally unacceptable".

Dr Mosley said: "Clarke Island, which is part of the Furneaux group, is a valuable nature reserve.

"Furthermore, we are totally opposed to the whole concept of nuclear power stations. They are neither safe nor cost effective.

"We are gratified that the senators are seeking alternatives to the flooding of the Franklin River area but our research has shown that the only viable alternative is thermal power."

The proposal to build a power station on Clarke Island was first submitted by Senator Rae to the Senate select committee on south-west Tasmania on March 5.

Senator Hamer announced last week and again yesterday that after examining the situation, he supported the suggestion.

He has recommended that a feasibility study be made.

Senator Hamer said: "Clarke Island as a base for such a power station is only a suggestion. What I am supporting is the concept of such a scheme. It is my belief that nuclear power is cheaper than coal and less likely to pollute the atmosphere."

CSO: 5100/7553



## URANIUM SALES PROSPECTS FAIRER; NUCLEAR INDUSTRY GROWING

Melbourne THE AGE (in English) 7 Aug 82 p 14

[Article by Nigel Wilson]

[Text]

PERTH. — Australia's uranium sales prospects have fallen sharply in the past decade and it is no longer possible to argue that Australia will be a key contributor to the expansion of the world nuclear industry.

Although reports in the past few days have indicated that there will be orders for Pancontinental's Jabiluka deposit soon and that the French want part of Yellirrie, this does not signal a new era for Australia's uranium.

On present predictions it is clear that Australia has missed the cream from the market for naturally-occurring uranium; the future appears to lie in processing uranium to fuel fast-breeder reactors.

The Ranger uranium inquiry conducted by Mr Justice Peter Fox reported in 1976 that Australia's annual uranium exports in 1985 would be between 11,500 and 15,000 tonnes. A year later the second Ranger report had cut this forecast to between 6000 and 7500 tonnes.

A recent paper by a Macquarie University research student, Mr Monte Silver, suggests that at best by 1985 Australia will be exporting 6000 tonnes of uranium.

The second Fox report suggested that by the turn of the century Australia would be exporting at least 20,000 tonnes of uranium a year.

Mr Silver argues that even with the probability of a continuing switch to nuclear energy from liquid hydrocarbons and coal, the

actual exports in that year will be no more than 15,000 tonnes.

More importantly, he says Australia will secure these orders only by displacing existing suppliers. Australia is potentially one of the lowest-cost producers of uranium in the world.

Australia's uranium producers hold contracts for 58,600 (about 59,500 tonnes) of uranium yellowcake (U3O8) for delivery by 1996.

At the official Australian Government floor price of \$US30 a pound (454 g) this is worth about \$3500 million.

The 58,600 short tons contracted sales also includes shipments delivered since 1975.

Although Australia still holds about 20 per cent of the world's low-cost uranium, nuclear power technology is moving away from reactors using just naturally occurring uranium.

The need in the 1990s to the 21st century appears to be for enriched uranium in fact nearly 90 per cent of the 500 or so commercial nuclear reactors either operating, being built, or on order around the world, need enriched uranium.

The uranium industry and the Federal Government now believe Australia should receive the added value from selling enriched uranium rather than face a declining market for natural uranium.

The Government and the nuclear industry believe enrichment will also provide a filip for the engineering industry through the transfer of the sophisticated technology needed for centrifuges and their maintenance.

# ENERGY MINISTER REVIEWS NUCLEAR SOURCES, POLICIES

## Report on Speech

Brisbane THE COURIER-MAIL in English 10 Aug 82 p 15

[Text] **SYDNEY.**— Australia would face an energy problem if nuclear power were not accepted as a power source, the Energy Minister, Sir John Carrick, warned yesterday.

In an address to the Constitution Association, he said nuclear power eventually would play a large part in energy generation despite government plans to conserve oil and encourage exploration.

"Australian policy aims to provide a measure of security against any disruption to oil imports in the shorter term and to maintain a high level of self-sufficiency in liquid fuels," he said.

But Australia should recognise that uranium would have to become an important source for electricity generation.

Energy conservation would be at risk unless nuclear power began to play a much more prominent role, he said.

Australia's present self-sufficiency level of 66 percent was likely to remain for this decade but without further discoveries it would be dependent increasingly on imports during the 1990s.

Sir John said legislation would be introduced into Federal Parliament in the next few weeks to provide a framework for the distribution of oil supplies in the case of an emergency.

## Clarifying Statement

Sydney THE SYDNEY MORNING HERALD in English 12 Aug 82 p 6

[Letter to the Editor]

[Text]

SIR, Under the heading: Minister stresses nuclear needs (Herald, August 10), your newspaper reports that I had said that "Australia faced an energy problem if nuclear power was not accepted as a power source."

In fact, I referred to the world outside Australia and specifically not to Australia in making that point.

I emphasised that the international energy agency had asserted that the living standards of most of the world could not be maintained, however intensive the use of conservation and alternative energy sources, without the significantly increased use of nuclear energy.

This envisaged the fullest possible use of coal, gas, biomass, solar and wind power within the limits of current technology.

It envisaged also that developed countries might well achieve a saving of up to 30 per cent on energy usage by effective conservation measures.

It took into account the serious environmental concerns of a number of countries, namely Canada and Scandinavia, at the "acid rain" and "greenhouse" effects on flora and fauna of the increasing use of coal.

Nuclear power for electricity generation is widely used throughout the world and has been so for more than 30 years. Currently there are 294 nuclear power stations in operation, 221 in the process of construction and a substantial number at the planning stage, including 31 on firm order.

Australia has abundant coal which historically has been supplied at very cheap cost to our power stations. This, plus the fact that the capital cost of building a nuclear power station can be as much as three or four times the cost of a coal-fired installation, has obviated the

need for Australia to look to nuclear power.

In the decade ahead it may well be that energy prices rise significantly and oil, which like coal is a non-renewable fuel, is particularly for industrial and synthetic fuel purposes. Nuclear power generation will become more and more competitive with coal in the conditions we face at this moment.

Australia is a comparatively energy rich country with limited oil resources. We have substantial coal, gas and uranium and we have a clear responsibility to provide those energy resources to the energy-hungry nations of the world.

We have a duty, too, in our own use patterns to vigorously conserve our resources and to develop substitute energy sources — particularly the renewables — wherever possible.

**Sir JOHN CARRICK,**  
Minister for National  
Development and Energy,  
Parliament House,  
Canberra.

August 10

CSO: 5100/7554

# OPPOSITION OFFICIAL EXPLAINS NUCLEAR-FREE VIEWS

Canberra THE WEEKEND AUSTRALIAN in English 7-8 Aug 82 p 16

[Letter to the Editor]

[Text] SIR - I write in response to your editorial of July 28, entitled *Piecemeal Approach To Achieving Peace* in which you conclude . . . "Mankind's future will remain under threat until there is a universal and enforceable nuclear disarmament treaty. This goal cannot be achieved by a piecemeal approach which can only upset the present delicate balance without in any way reducing the possibility of nuclear war."

Your conclusion is completely opposed to that reached by the highly distinguished group of disarmament experts recently convened by the United Nations' Secretary-General. They included government, scientific and diplomatic experts from Western Europe, Scandinavia, Indonesia, Egypt, Latin America, Africa and Asia. After 14 months' work, these experts concluded that "disarmament efforts in a regional context, while not being a substitute for efforts at the global level, could greatly facilitate the achievement of global disarmament measures."

That conclusion is one basis for my proposal, which you have called "superficially very attractive," but there are other extremely important elements in my proposal which your editorial ignores. You make passing reference to the fact that in 1979 the international community, by a vote of 128 to 0, called for

the continent of Africa to be established as a nuclear weapons-free zone.

But you make no mention of the following facts:

● First, the entire Antarctic continent has already been successfully established as a nuclear weapons-free zone by the Antarctic Treaty of 1961. Both superpowers are parties to this treaty and so, significantly, are South Africa and Argentina. Thus a large section of the southern hemisphere is already observed as a nuclear weapons-free zone by the Americans, the Russians, and the two nations in the southern hemisphere about which we should currently be most concerned.

● Second, the States of Latin America have, in the 1967 Treaty of Tlatelolco, committed themselves not to acquire, test, manufacture or use nuclear weapons. This treaty is already in force for 22 Latin American States and of those remaining, Brazil and Chile have ratified the treaty and Argentina has signed but not yet ratified it. Most significantly, both superpowers and the other nuclear weapons States of the northern hemisphere have bound themselves not to install, store, test, manufacture or fire nuclear weapons into or from this region. The treaty thus protects South American countries from possible nuclear attack as well as averting the

possibility of a nuclear weapons race in that region.

● Third, well over 100 States, including the majority of those in the southern hemisphere, have committed themselves, under the Nuclear Non-Proliferation Treaty (NPT), not to acquire, possess, test or launch nuclear weapons (I applaud the fact that one of the most recent signatories was Indonesia.) Article 7 of the NPT specifically acknowledges the right of States to conclude "regional treaties" in order to ensure the total absence of nuclear weapons in their respective territories.

● Finally, in 1975 a proposal was advanced for a nuclear weapons-free zone in the southern Pacific (another large area of the southern hemisphere). One hundred and ten nations supported this - including Australia and virtually every other State in the southern hemisphere.

Careful examination therefore shows that two of the largest land masses in this hemisphere, Antarctica and South America, are already effectively nuclear weapons-free zones. Both superpowers have committed themselves unequivocally to respect these zones. The vast majority of those African States in the southern hemisphere have declared they wish to be a nuclear weapons-free zone. Of the other major land masses, Australia and Indo-

nesia have forsworn nuclear weapons by their membership of the NPT. Finally, but importantly, virtually all the Pacific island States wish to remain nuclear weapons-free.

I am not, as you suggest, oblivious to the dangers posed by the undoubted ability of South Africa and Argentina to move to production of nuclear weapons. Quite the contrary — this potential danger has moved me to advance this proposal for this region before it is too late.

I recognise that we cannot simply forbid the superpowers to launch nuclear submarines on the high seas in this hemisphere. But I BELIEVE THERE ARE CLEAR INDICATIONS (in Antarctica and Latin America) that if the States of this hemisphere move positively, the superpowers may be persuaded by our efforts to declare their co-operation. It is only by gradually limiting the areas of confrontation

on that de-escalation of the nuclear arms race is possible.

It is imperative, particularly since the collapse of the recent UN Special Session on Disarmament, that we take every realistic initiative to scale down the nuclear arms race. The proposal I have advanced is ambitious — but in the light of the foregoing it is not unrealistic.

**LIONEL BOWEN**  
Deputy Leader of the  
Opposition  
Canberra

CSO: 5100/7554

LEADER OF DEMOCRATS 'FIRM' IN NUCLEAR OPPOSITION

Brisbane THE COURIER-MERCURY in English 5 Aug 84 p 11

[Text]

CANBERRA.— The Australian Democrats leader, Senator Chipp, yesterday pledged intractable opposition to uranium mining and the nuclear industry.

He said he would retain this position even if his party changed its present policy.

Senator Chipp told a National Press Club lunch he believed the uranium issue was by far the most important question ever debated in the Australian Parliament.

He used the issue to illustrate his argument that the present party system in Australia forced men and women to vote as they were told, not according to their consciences.

"They are forced to vote against what they regard to be in the interests of their

children and their constituents on a matter which affects their very survival," Senator Chipp said.

But he said the Democrats' policy was decided on and amended by every single member of the party.

"Now that is the most tiresome, the most tedious, the most inefficient and the most irritating way of formulating policy that I could possibly devise," he said. "But it has worked."

Senator Chipp said he would be able to take his own stance on uranium, despite any change in party policy, because Democrat members of parliament had a duty to vote against party policy if it offended a member's conscience or went against the views of his or her constituents.

CSO: 5100/7354

## MONAZITE SAFEGUARDS SAME AS FOR YELLOWCAKE LEADS

Perth THE WEST AUSTRALIAN in English 12 Aug 82 p 5

[Text]

**THE export of monazite should be subject to the same safeguards as radioactive yellowcake, according to the associate professor of physics at Murdoch University, Professor Phil Jennings.**

He said in Perth yesterday that monazite had the potential to be used in nuclear weapons, so it should be subject to stricter export controls.

Western Australia had a virtual monopoly on the monazite production Professor Jennings said.

The companies producing it were well aware of its ultimate uses, but were reluctant to admit it.

This was because the thorium that could be extracted from monazite could be used in nuclear power plants and was becoming an increasingly attractive sideline.

Till recently the basis of demand for the monazite was the rare earths that it contained.

Thorium had been a by-product that was

not in high demand, but it was becoming more in demand.

There were now at least two commercial reactors overseas operating on a thorium fuel cycle. Thorium was a cheaper and more abundant alternative fuel.

Professor Jennings was commenting on the monazite issue after a seminar at Murdoch University, where he spoke on technological decision making.

Professor Jennings said he could understand the attitude of the companies mining monazite in WA, but he was concerned about the consequences.

Several groups of workers involved in the processing and mining of the monazite were still at risk.

In his talk at the seminar Professor Jennings said that the community had lost confidence in the ability of science and technology to provide answers to problems.

Important research programmes were under threat as the result

of cutbacks stemming from the lack of public confidence.

There had been hasty ventures into such areas of new technology as the nuclear industry, for which the public was now paying the price.

**'Incorrect'**

In SYDNEY yesterday, a spokesman for the Australian Atomic Energy Commission said it was incorrect to say that a thorium fuel existed.

"The technology does not exist at the moment for a wholly commercial thorium fuel cycle. In fact, it has not even been achieved at a research level," he said.

"At present, thorium is only a small component of the fuel in small research reactors."

"These research reactors are being used to understand the behaviour of the thorium and the generation of uranium 233 as a fissile fuel."

"All the research to date has shown that there are many inherent problems in a thorium fuel cycle. These

problems are very difficult to overcome and there is no realistic prospect of doing so at present."

The spokesman said that the possibility of developing a thorium fuel cycle to generate uranium 233 went back 20 years. It was the result of anxiety induced by predictions in the 1950s of the worldwide development of nuclear power and a resultant scarcity of uranium resources to fuel demand.

These predictions had never been realised.

More uranium resources had been discovered than had ever been visualised, and the demand had even been reached where there was a major downturn in the uranium market.

The spokesman said that a thorium fuel cycle had at one stage been designed for use in two nuclear power reactors in Europe, but these reactors had never got off the ground because of the difficulties in perfecting the cycle.

"The thorium fuel cycle is not yet a reality. It is still a dream," he said.

EARTH CLOSING FOR MAR. EARTHQUAKE AFTER HIG. 1963 1413

Bristow: The Coasters' Mail on Encl Feb 24, Aug 82, 1982.

100

Production of the film at Mervyn's is done with a record length in the film market in 1980—some 100 days so that the release of the film is made about three to four months after the start of production.

Mary Kathleen Uranium Ltd directors said this yesterday in announcing a 180 percent profit rise in the June half to \$4.97 million from \$1.7 million the year before.

They said the big rise was because of a high level of deliveries, favorable Australian-United States exchange rate movements, high production rates and higher interest income from money market investments.

Production of 505 tonnes of uranium oxide in the half was the highest for any six months period at Mary Kathleen.

It compares with 393 tonnes for the first half of 1981 and 825 tonnes for the full year.

Directors attributed this to a concerted effort by the workforce, lower industrial disruption and a high level of plant performance.

They said the February estimate that mining would cease by the end of September and attainment by the end of December had been changed by the current mine production rates.

Now, mining would end in mid-October and treatment at the end of November.

The profit was on turnover up 22 percent to \$36.7 million and investment income up to \$3.3 million from \$2.7 million.

Pre-tax profit took a massive leap to \$10.38 million from \$2.36 million.

No dividend is recommended but directors said one was expected to be declared at year-end.

Directors said second half earnings, as foreshadowed, would be lower because less yellowcake remained to be shipped under contracts.

However, the result for the full year would also depend on a reassessment of rehabilitation costs to be carried out when the Queensland Government approved the plan.



# SYNTHETIC ROCK TERMED BEST FOR NUCLEAR WASTE DISPOSAL

Canberra THE AUSTRALIAN In English 24 Aug. 82 p. 3

[Article by Ernst Singer]

[Text]

AUSTRALIA may be only three or four years away from taking an international lead in the safe disposal and storage of nuclear wastes, some Australian Atomic Energy Commission officials believe.

Dr Keith Reeve, who is heading the research for Synroc, said the technology is being developed at a rate which could allow Australia to be the first to build a plant to dispose of nuclear waste by the year 2000, a substantial improvement on some European estimates.

The Federal Government allocated an additional \$1 million in this year's Budget for the Atomic Energy Commission to build a pilot manufacturing plant as a forerunner to the material's commercial manufacture.

Dr Reeve said yesterday the plant will be built at Lucas Heights, which has developed and used nuclear materials, but to make this worthwhile, it had to be designed to be compatible with these uses.

He said the plant would be housed in a separate building

and would take three to four years to complete and perfect.

"We have to put all our experience with Synroc together now and demonstrate we can perform the whole manufacturing process smoothly," he said.

One of the main reasons Synroc was "the material of the future" was that it was far more stable in water than glass.

The main criticism of Synroc has now turned towards its cost, he said. "It is seen as something of a Rolls-Royce at the moment. We have to show the nuclear industry the Rolls-Royce is available on a cost-acceptable basis."

And, of a preliminary estimate it doesn't seem as though it will cost significantly more than glass.

Dr Reeve believes the plant will keep nuclear waste safely free from the environment for 100,000 years.

He sees it as a significant export if one of the nations with a major nuclear power capacity, such as the United States, Britain, or France, begins using it.

# NEW FEDERAL BUDGET PROVISIONS FOR THREE OF FOUR INITIATIVES

Canberra THE AUSTRALIAN in English 18 Aug 82 p 16

[Article by Bruce Jacques: "Nuclear Initiatives Point To Gearing Up of Industry"]

[Text]

THE Budget provided for three initiatives in the nuclear area the most costly being a \$1.75 million allocation for rehabilitation of premises mining, milling and testing sites.

The Government will spend \$800,000 this year to rehabilitate the site of the Rum Jungle uranium mine in the Northern Territory.

The program will be aimed at reducing pollution of the Finniss River by heavy metals and lowering public health hazards at the mine site.

"Subject to satisfactory arrangements being completed, the Rum Jungle program will be carried out in the Northern Territory Government over four years," a supplementary budget document said.

A sum of \$54,000 has been provided to initiate work on the rehabilitation of tailings dumps associated with the former Molle and South Alligator (Rockhole) uranium mill sites in the Northern Territory.

A sum of \$184,000 has been provided for activities connected with the manufacture of former atom bomb fuel at Maralinga and Berrigan, South Australia and at the Molle and South Alligator sites.

They included provision to update information on residual radioactivity, the need for

which was foreshadowed in reports published by the Australian Ionising Radiation Advisory Council.

The Government will also make a new allocation of just over \$1 million this year for a pilot plant to produce full-sized canisters of Synroc, a material for storing nuclear waste.

The funds will be provided by the Atomic Energy Commission and will be in addition to a \$230,000 grant this year for establishment of Synroc research facilities at the Lucas Heights research laboratories.

Experiments so far on Synroc developed by Professor Ted Ringwood of the Australian National University have shown its ability to take up and contain nearly all the elements in high-level nuclear waste.

The Budget document pointed out that Australia did not produce high-level radioactive waste but that development of Synroc would contribute to the future technology waste disposal.

Promotion of Synroc may be seen in some quarters as part of a move to gear up for a post-nuclear environment industry.

It is expected that the pilot demonstration at the AEC will enable the optimum method to be selected for the production of Synroc blocks, the document said.

If its ability is confirmed Synroc will have the potential to offer economic advantages arising from earlier disposal of high level wastes and provision of a greater degree of long-term protection of the environment.

Research to date on Synroc has confirmed the promise of Professor Ringwood's original idea.

The current program will facilitate a thorough assessment of the practicability of the process and represent a further step in the evaluation of Synroc as an option for stabilising highly radioactive waste liquids arising from spent fuel reprocessing.

The Government is also providing \$291,000 for a survey of the health of Australian personnel involved in the British atomic tests in Australia in the 1950s.

So far 7000 people have been traced and will be included in a health survey this year.

# ANALYSIS OF POLITICS INVOLVED IN NUCLEAR-SHIP ISSUE

Canberra THE WEEKEND AUSTRALIAN in English 21-22 Aug 82 p 4

[Article by Russell Schneider: "PM Pushes Nuclear Ship Issue"]

[Text]

THE Prime Minister, Mr Fraser, still intends capitalising on the nuclear ships issue, despite some pussy-footing by the Government and the Opposition.

The big problem for Mr Fraser is whether he can stop the Labor Party - now sniffing electoral victory and determined to deny him an issue - from running away from the subject.

The controversial legislation on nuclear ships which Mr Fraser promised after his confrontation with the Victorian Premier, Mr Cain, several months ago was the first priority for the Government's legislative program after Tuesday's Budget. But it received remarkably low-key treatment.

The legislation ostensibly confirms the federal right to determine which ships can enter Australian ports.

But it is far more significant than that, although anyone listening to the Minister for Defence, Mr Sinclair, when he introduced it could be excused for regarding it as innocuous.

This has allowed the moderate members of the ALP, who can see its potential electoral danger, to argue the bill should go through.

It is only after a close reading of the legislation that its real intent becomes clear - although the

Government, which has spent considerable time and effort in drafting the legislation, initially avoided spelling this out.

It was not until Mr Fraser was asked about the legislation that some of the "hooks" emerged.

Asked whether the legislation would limit the duration of visits by nuclear armed or powered warships to the few days involved in a goodwill visit or the much longer periods involved in being effectively placed in Australia, Mr Fraser said: "It means they can stay as long as the Australian Government wanted them."

This statement is significant, because it opens up the difference between the Government and the ALP on the question.

The ALP policy accepts transit visits by allied ships, whether nuclear armed or not.

But this legislation is aimed at allowing something far more than transit visits.

The ALP caucus foreign affairs and defence committee looked at the legislation last week.

It is expected to recommend that the Labor Party should not oppose the bill when it comes up for debate in Parliament.

Caucus members adopted the sensible line expressed by a former minister, Mr Bill Morrison, at the recent NSW ALP conference.

At that time Mr Morrison ar-

gued the importance of the ANZUS alliance and the foolishness of Labor opposing visits by American ships.

Nevertheless, many ALP hardliners and many left-wing unions are opposed to the visits of the ships, as was shown when the guided-missile destroyer USS Goldsborough visited Australia several weeks ago in what all sides in politics knew was a deliberate provocative gesture.

Mr Sinclair tried to make out last week that the legislation merely reaffirmed Australia's commitment to ANZUS. His description of the bill and its contents was very low key.

But there are a number of interesting aspects to the seven pages and 15 clauses of the bill.

### Penalties

For example, it allows not only the Minister for Defence, but also any senior public servant or defence force officer delegated by him, the right to approve visits by foreign warships.

The bill says such ships may obtain access "during a specified period" to all or any ports.

The question is: What is meant by a specified period?

And Mr Fraser has made it clear this is not to be regarded as merely a matter of days or weeks. It could be a matter of years, or the lifetime of a Government.

In fact, the legislation would allow "all or any of the warships of a particular country" to be

based in Australia anytime the Government wished.

So it is feasible that the entire US Pacific fleet could, if the US wished and an Australian government agreed, sail into the port of Melbourne at any time.

The bill also gives the Government extensive powers backed up by substantial penalties to deal with anyone — presumably even a State premier — who either opposes the entry or refuses to provide goods or services to the ship.

Anybody who tried to "prevent, hinder or obstruct" the entry of the ship, its berthing, its loading or unloading or the supply of services could be fined \$1000 and sent to jail for six months.

The legislation would also impose these penalties on anyone who interfered with the entry to or departure from a wharf where the ship was berthed.

This would be a harsh penalty to be imposed on anti-nuclear demonstrators who tried to picket a wharf.

The ALP moderates are sensibly arguing that these powers are really not much different from those already given the Commonwealth under the Crimes Act, and other defence legislation.

But the issue is a particularly sensitive one, especially for left-wing unions, and Mr Fraser is clearly hoping they will exert pressure on Labor MPs before the bill becomes law.

## BRIEFS

**DARWIN ANTINUCLEAR ARRESTS**--Darwin--Police arrested 16 anti-nuclear demonstrators who chained themselves to a wharf gate in Darwin yesterday to protest against an overseas shipment of yellowcake from the Ranger uranium mine. Seven men and nine women were arrested after more than 30 police used boltcutters to free them from the main gate of the Fort Hill wharf and allow a 12-truck convoy carrying more than 30 containers of yellowcake to unload. A police spokesman said the protesters had been charged with loitering and breaking a port authority by-law. Police moved in after more than three hours of negotiations with the protesters, the Northern Territory Port Authority, the Waterside Workers Federation and the drivers who had carried the load from the Ranger mine. They told the demonstrators they would be charged with loitering unless they gave up their protest and allowed the yellowcake through. A number moved aside and chanted and sang anti-nuclear slogans and songs as police moved in to cut the thick chains which bound the rest of the protesters to the gate. [Text] [Brisbane THE COURIER-MAIL in English 18 Aug 82 p 16]

**RANGER URANIUM EARNINGS**--Sydney--Energy Resources of Australia Ltd, the operator of the Ranger uranium project in the Northern Territory, has announced a maiden final profit of \$37.86 million for the year to June 30. Turnover was \$145.99 million and final dividend has been set at 4c a share, payable on November 30. Although the group posted a \$7.73 million profit for the six months to December 31 last year, it did not declare an interim dividend. ERA was formed in 1980 to acquire from the Federal government and the Australian Atomic Energy Commission their interests in the Ranger project, as well as those interests held by Peko-Wallsend Ltd. ERA became a public company in July, 1980. In September, 1980, an agreement was entered into by ERA, Peko and EZ Industries Ltd with a number of German and Japanese organisations, mainly power utilities, for those organisations to participate as shareholders in ERA. ERA paid tax of \$7.72 million. Interest was \$48.05 million and depreciation amounted to \$17.02 million. Investment and other income was \$1.69 million. Earnings a share amounted to 9.2c and net tangible asset backing was 88c a share. Profit for the second half was \$30.13 million. [Text] [Brisbane THE COURIER-MAIL in English 20 Aug 82 p 15]

CSO: 5100/7555

## G. K. EDDY ON PRELIMINARY TALKS WITH FRENCH TEAM

Madras THE HINDU in English 7 Sep 82 p 9

[Article by G. K. Eddy]

[Text] NEW DELHI, Sept. 6--There was only a preliminary exchange of views today between Indian officials and the visiting French team on the nature and extent of safeguards for the nuclear fuel for Tarapur to be supplied by France.

The three-member team led by Mr. Jacques Andreani, head of the political department of the French Foreign Ministry, arrived this morning in Bombay and took the connecting flight to Delhi.

There was only one session this afternoon at which the Foreign Secretary, Mr. M. K. Rasgotra, and the Chairman of the Atomic Energy Commission, Mr. H. N. Sethna, met Mr. Andreani and his colleagues to get a clearer elucidation of the French position before engaging in serious discussions. There will be two or three more rounds of talks during the next two days before the French team leaves for Bombay on Wednesday evening to take a connecting Air France flight back home.

Meanwhile, the American Ambassador, Mr. Harry Barnes, who stayed behind in the U.S. on home leave after the Prime Minister, Mrs. Indira Gandhi's visit, has returned to Delhi and been in touch with the External Affairs Ministry on the difficulties that have arisen over the proposed French supply of enriched uranium for Tarapur within the framework of the 1963 agreement. It is not yet known whether he has come forward with any new ideas on the subject from Washington.

Drafts of letters: The State Department has transmitted to the U.S. embassy in Delhi for forwarding to the External Affairs Ministry the drafts of the letters to be exchanged between the two countries, transferring the fuel supply responsibility to France during the remaining ten years of the 1963 agreement. But the Government of India is in no hurry to receive these drafts, since the proposed exchange of letters can take place with the U.S. only after the safeguards issue has been satisfactorily settled with France.

Meanwhile, the U.S. is more immediately concerned about obtaining from the U.S. an authoritative version of what had been agreed upon with France during the

earlier discussions, whether it had been made abundantly clear that the fuel is to be supplied under the existing safeguard provisions. The press briefing given by the American spokesman in Washington at the time of the announcement of the new arrangement stated quite clearly that France would be supplying the fuel under the 1963 agreement.

The French proposal which India has rejected is that the two countries should first exchange letters stipulating the terms and conditions of the fuel supply followed by an agreement with the IAEA within six months on the nature and extent of the safeguards to be applied to it. The actual supply of enriched uranium will commence only after conclusion of this agreement. In other words, after India accepts the demand for stricter safeguards with both pursuit and perpetuity clauses.

The current discussions in Delhi will be followed by further talks in Paris after the two governments have reviewed the presisting differences over the interpretation of their mutual obligations. At one stage, it was suggested that Mr. Rasgotra will pay a visit to Paris on September 17 and an appointment was accordingly fixed with the Secretary-General of the French Foreign Ministry, Mr. Francis Guttman.

But it was subsequently cancelled when the French Government offered to send a team led by Mr. Adreani to discuss the political aspects before talking about supply arrangements. The leader of the team has no plenipotentiary powers to commit his Government on any essential aspects of the safeguards issue without referring back to Paris for a final decision.

Starting point: The preliminary discussions in Delhi are, therefore, viewed only as the starting point of fairly protracted negotiations on the subject. France might eventually give up its insistence on applying the perpetuity principle if India reaffirms the negative application of the pursuit clause that is already inherent in the 1963 agreement, as amplified after the Pokhran explosion, through an exchange of letters between the Chairmen of the Indian and U.S. Atomic Energy Commissions.

The French continue to maintain that the message verbally conveyed on July 27 by the Charge D'Affaires in Delhi, and through the permanent mission in New York for the Prime Minister's information, had indicated while agreeing in principle to supply the fuel that the current level of safeguards would be applicable. But the Indian understanding of what was communicated was that France had agreed in principle to take over the responsibility of providing the fuel from the U.S. as an on-going arrangement under the 1963 agreement.

The minutes maintained by the two governments of the talks on the subject between the visiting French Foreign Minister, Mr. Claude Cheysson, and the External Affairs Minister, Mr. P. V. Narasimha Rao, seemed to differ on this essential point.

The main purpose of the current talks at the official-level is to clear the decks and prepare the ground for a political settlement, if possible, before reaching the conclusion that it would be better to call off the proposed



arrangement with regard and return to the earlier position. The Indian intention is to...

In the French hierarchy, the nuclear bureaucracy is a very powerful lobby that is not easily moved from the French Foreign Ministry, unless they really want to. It does not insist on more stringent safeguards, but it does insist that the issue has to be tackled at the highest level possible. The issue has to be tackled either before or during the negotiations...

CSO: 5100/7139



## POSSIBLE TRAP IN FUEL AGREEMENT WITH FRANCE ALLEGED

Calcutta THE STATESMAN in English 30 Aug 82 p 9

[Text] CHANDIGARH, Aug. 29--Mr Krishan Kant, Janata leader, has cautioned the Centre against a possible trap in its deal for atomic fuel with France. He said he had reasons to believe that the USA had got India into accepting safeguards even in the fuel supply arrangement with France.

He was surprised that India was getting into a position which she had all along opposed. Earlier, that position had created problems with the USA. He said there should be no reversal of India's earlier stand. If need be, the agreement with the USA could be terminated and India could use MOX (mixed oxide fuel); the nuclear fuel developed by Indian scientists. This development was a major breakthrough in the field.

Addressing a Press conference here today, Mr Kant said in pursuance of the Indira-Reagan agreement of nuclear fuel supply to Tarapur a French delegation, led by the Director-General of COMEGA, Mr De Wissoco was arriving in New Delhi on August 30. Significantly the delegation was composed of all members of their atomic energy establishment. They had, this time, side-stepped their Foreign Minister, Mr Cheysson because he was not familiar with the implications of technological and safeguard issues most relevant in the present talks.

The French authorities, he said, had recognized this aspect. Mr Cheysson himself had admitted so in his private talks while in New Delhi during his last visit. His statement there that the low-enriched uranium to be supplied would come under the International Atomic Energy Agency safeguards as well as the Indo-U.S. Cooperation Agreement of 1963 were noteworthy. The two were different. While the Indo-U.S. agreement did not have the "pursuit" and "perpetuity" clauses, the latest IAEA safeguards included both.

He said that the Indira-Reagan agreement had been reached by sidestepping the Indian Atomic Energy Commission and its experts. India had to be very careful in selecting its delegation for the talks with the French team.

It was possible that the Americans had concluded that India had been yielding point by point and, therefore, they could manoeuvre it into this kind of situation. This was reflected in an article by the former U.S. Ambassador to India Mr Goheen in The New York Times. Mr Goheen had said that it was rather

India had made all the confessions in a very generous way and given in on many points.

The Janata leader said that it was too late for India to say now that MOX was costly when the Government had already spent Rs 38 crores on this. This money could not be retrieved.

CSO: 5100/7153

# NEW FRENCH TERMS ON TARAPUR FUEL UNACCEPTABLE

Madras THE HINDU in English 29 Aug 82 p 1

[Article by G. K. Reddy]

[Text] NEW DELHI, Aug. 28--The Government of India, in a written reply to the French note, has rejected the demand for more stringent safeguards with pursuit and perpetuity clauses, maintaining quite firmly that the proposed supply of nuclear fuel for Tarapur by France must be within the framework of the 1963 Indo-American agreement.

The Principal Secretary to the Prime Minister, Dr. P. C. Alexander, called the French Charge d'Affaires, Mr. Michel Galas, on Thursday and handed over the Indian reply for transmission to his government.

As India sees no point in having technical level talks on the fuel supply arrangements until this controversy over safeguards has been settled, the visit of the French team headed by the Director-General of Cogema, Mr. Francois de Wissocq, has been postponed for the present. It was due to arrive in Delhi on Monday, August 30, to begin these discussions. The Indian side does not want to have these talks at this stage, if the French technical team is coming without any political authority to discuss the safeguards question.

Meanwhile, Mr. G. Parthasarathy, who happened to be in Paris this week on UNESCO work, met Mr. Jacques Attali, Special Adviser to President Mitterrand, one of the more important figures in the present French Government, to convey India's surprise over the new French stand and make it abundantly clear that it was totally unacceptable. It remains to be seen how Mr. Mitterrand and his advisers would react to this Indian refusal to submit to the new French conditions.

The Government of India continues to maintain that it was given to understand by both the U.S. and France earlier that the new fuel supply arrangement would be subject to only the existing level of safeguards, which was made quite explicit during the visit of the French Foreign Minister, Mr. Claude Cheysson. It was not aware, until the French Charge d'Affaires presented a note to the Additional Secretary in the External Affairs Ministry dealing with Europe, Dr. J. S. Teja, on August 18 that there had been a shift in the French position with or without the prior knowledge of the United States.

The Foreign Secretary, Mr. M. K. Rasgotra, summoned the U.S. Charge d'Affaires, Mr. Marion Creekmore, the next day to voice India's dismay over this development and tell him quite clearly that, if France insisted on additional safeguards contrary to the earlier assurances, the whole arrangement would collapse. Three days later, on August 22, he called the French envoy to tell him in equally unmistakable terms, before he accompanied the Prime Minister on her visit to Mauritius and Mozambique, that India would rather drop the idea of obtaining the enriched uranium from France than submit to the new conditions.

It is against this general background that the government decided to convey to France in writing that India did not deem it necessary to enter into a fresh safeguards agreement with IAEA, since it was clearly understood that the new fuel supply arrangement was being made only under the existing level of safeguards with no pursuit and perpetuity clauses added to it. All that would require to be done, in India's view, was simply to notify IAEA of the new supply arrangement replacing the U.S. within the framework of the 1963 agreement.

There is no reply yet from the U.S. to the points raised by the Foreign Secretary in his talk with the American Charge d'Affaires. The ball is now in the French court and until it has heard from Paris or Washington, India will not feel called upon to disclose how it proposes to deal with this situation.

The French Charge d'Affaires called on Dr. Teja today to discuss in what manner the news of the postponement of the De Wissocq visit should be broken to the press without going into the details of the difficulties that have arisen over the fuel supply arrangement. And as it so happened the two sides could not agree even on how to explain away the postponement.

CSO: 5100/7152a

# QUESTIONS RAISED ABOUT AGREEMENT ON TARAPUR FUEL

Bombay THE TIMES OF INDIA in English 27 Aug 82 pp 1, 9

[Text] NEW DELHI, August 26--DID India rush into an agreement with the U.S. on the French supplies of enriched uranium for Tarapur announced with great fanfare during Mrs. Indira Gandhi's visit to Washington?

This question is being asked in diplomatic circles here as nuclear fuel for Tarapur continues to be a controversial issue, notwithstanding the accord with the U.S.

They are surprised that an agreement involving as complex an issue as nuclear safeguards which has been the subject of many a doctoral thesis, was firmed up without India seeking clarifications and getting assurances about its major concerns.

Obviously, the Indian delegation failed to convey to the U.S. side the firm Indian policy of not accepting any additional safeguards flowing from the discriminatory nuclear non-proliferation treaty. If it had done so, the U.S. could not have assured the fuel on behalf of France.

The U.S. delegation consisted of experts and it is unlikely that it had not studied the safeguards angle in its talks with India but the grey area in the bilateral accord was allowed to remain. The Indian side at the talks had no expert and it is likely that it did not scrutinise the fine print with regard to the safeguards issue.

There are two possibilities. Either India at these official talks agreed to approach the International Atomic Energy Agency again without realising the implications or it overlooked this grey area knowingly with the intention of sorting out these difficulties later.

In any case, the arrangements were not tied up before the accord--which appears to be turning into a trilateral discord--was announced.

The Indian side needed to be extra careful about the French being designated as a nuclear fuel supplier in the place of the U.S. in view of the past French record. The Indian experience regarding collaboration with France on the experimental fast breeder reactor at Kalpakkam is not quite satisfactory.

The French could not resist pressures from the U.S. and went back on their understanding with Pakistan with regard to nuclear supplies. They caved in after much initial resistance when it came to keeping their commitment to South Korea.

However, true to the hypocrisy of the nuclear weapons states, France has not allowed any proliferation consideration to come in its way of helping South Africa in its nuclear programme.

If France wants, it can marshal any number of arguments why it cannot supply enriched uranium to India without the upgraded safeguards being enforced by IAEA. It is also those on behalf of the nuclear suppliers' club which has further refined these safeguards.

Even though it is not a signatory to NPT, France has given an undertaking to NAEA that in matters of commercial operations and exports, it would consider itself as if it were a signatory to the treaty.

NPT was a milestone in the evolution of the nuclear safeguards regime which has become progressively more and more stringent.

India had rejected the previous U.S. suggestions to change its policy on accepting safeguards and even the Janata government had not agreed to any "additional safeguards". Thus, when the U.S. suggested that France could supply enriched uranium for Tarapur, the clear brief given by the cabinet was that the supplies would come without any additional safeguards.

On the basis of this, categorical statements were made on behalf of the government, after the accord with the U.S. was announced, the only point of dispute referred to by both the sides was about the reprocessing of spent fuel (MOU). It took it for granted that as far as the conditions for the supply of French fuel are concerned, firm arrangement had been made with the U.S. as well as France.

When the French Foreign Minister, Mr. Claude Chysson, came here, he was very forthcoming on the nuclear fuel issue. However, his assurances have to be examined with greater care before the French are charged with turning a volte face.

Before arriving here, he said in Seoul that the French supplies will be subject to two conditions: non-proliferation and control by an international body.

In New Delhi at his press conference, he said that France would insist only on the "same types of safeguards of the IAEA as applicable elsewhere".

Herein lies the catch. India's understanding was that the IAEA safeguards as applicable to Tarapur under the trilateral agreement involving the U.S. were adequate. The French side has, in its draft agreement sent to New Delhi, made it clear that it would insist on the upgraded IAEA safeguards.

The trilateral agreement of January 2, 1971, makes no provision for pursuit and perpetuity clauses which are objectionable from the Indian point of view. The pursuit clause will, in effect, amount to bringing facilities other than Tarapur under safeguards. For example, a fast breeder reactor which uses a by-product of the French fuel will also automatically come under safeguards.

The perpetuity concept will prolong the safeguards beyond the term of the Indo-U.S. agreement which expires in 1993. The Indo-U.S. agreement in 1963 did not explicitly refer to the pursuit clause and has no provision for a perpetuity clause. The same is the case with the trilateral agreement of 1971 since that incorporated the safeguards provisions of IAEA as they existed then.

The IAEA safeguards were further refined in the form of a "blue book" a little after the trilateral agreement with India was signed. The safeguards were made more stringent in 1974. Then came the guidelines of the nuclear suppliers' club, the members of which also set their safeguards enforced through IAEA. These guidelines were finalised in 1974 not long after the peaceful nuclear explosion by India, though these were made public much later.

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## CPI-M LEADER'S CONTENTS ON TARAPUR FUEL ARRANGEMENT

New Delhi PATRIOT in English 3 Sep 82 pp 1, 7

[Text] CPI-M leader P Ramamurti has charged the Prime Minister with having knuckled under US economic blackmail and compromised the unanimous national position against accepting nuclear fuel from a source other than the US for the Tarapur atomic power plant.

Addressing newsmen on Thursday, he presented excerpts from the minutes of the Indo-US negotiations (held in February, June and November, 1981 at Washington and Delhi alternately) to corroborate his claim that India had reversed its position on the question by accepting the new arrangement of French fuel supply during Mrs Gandhi's recent visit to the US.

He said he had got the minutes from the US where these were available to members of the US Congress and some of the excerpts found in the Congressional reports.

At one stage of the talks, the Indian delegation had categorically stated: 'The question of a new source of fuel for Tarapur does not arise at the moment, as we intend to run the plant with Mixed Oxide fuel (MOX) using plutonium obtained from reprocessing the spent fuel'. It further declared that 'safeguards resulted solely or exclusively from the supply of the US fuel in the absence of which the entire agreement would be void'.

At another point secretary, Deptt. of Atomic Energy Dr Sethna had bluntly said: 'IAEA safeguards will not be acceptable to us. If there is no supply there can be no safeguards. In our view, no Government can accept such a condition'.

However, at the November, 1981 talks, Mr James Malony of the US team threatened India: 'The current legislation governing the US Export-Import Bank specifies that if a country that has accepted the safeguards materially violates, abrogates or terminates any guarantees or other undertakings to the US made in the agreement for civilian nuclear cooperation, EXIM Bank credits to it shall cease. The question would also arise of what might happen on the front of economic assistance or in the multinational institutions'.

This, Mr Ramamurti felt, eventually worked. But he added that not only was no nuclear scientist from India taken to the US during Mrs Gandhi's latest visit, they were also kept in the dark about the nature of the Indo-US talks on the subject that were carried on from January this year. These negotiations were held behind the back of these scientists, he underlined.



## BRIEFS

DELEGATION TO VIENNA--Dr H N Sethna, chairman of the Atomic Energy Commission, will lead an Indian delegation to the International Atomic Energy Agency (IAEA) conference at Vienna next month, reports UNI. Dr Sethna may utilise this opportunity to discuss with the officials of IAEA and Government. The issue of fuel supply to Tarapur atomic power plant by France. The delay in the supply of enriched uranium has restricted the functioning of the plant to less than 50 per cent of its capacity. The existing fuel is being stretched to keep the plant running. [New Delhi PATRIOT in English 1 Sep 82 p 5]

CHINESE URANIUM OFFER--NEW DELHI, Sept. 1--Dr Subramanian Swamy, M.P., and Deputy Leader of the Janata Party in Parliament, said here today that if the Government was in urgent need of enriched uranium without any safeguards whatsoever, he was prepared to offer his services to have it procured from the People's Republic of China. In a statement, Dr Swamy urged the Government to formulate an alternative plan, consistent with the country's goal of national self-reliance. As a first step the Government should order the construction of a gaseous centrifuge plant for producing its own enriched uranium. UNI adds: India is in touch with France on fuel supply for the Tarapur atomic power plant, an External Affairs Ministry spokesman said here today. He was referring to reports from Paris that France would not supply enriched uranium for Tarapur unless India agreed to the tightened safeguards of the International Atomic Energy Agency. [Calcutta THE STATESMAN in English 2 Sep 82 p 1]

CSO: 5100/7156

# NO DECISION ON CONSTRUCTION OF NUCLEAR POWER STATION

Jakarta SINAR HARAPAN in Indonesian 13 Jul 82 pp 1, 5, 8

[Text] At the end of June, experts from the National Atomic Energy Agency (BATAN) met in Semarang to discuss several qualifications and conditions from reports of the results of an agreement signed with the Italian Atomic Energy Agency (NIRA) in Jakarta in 1977. NIRA agreed to help BATAN study the feasibility of building Indonesia's first nuclear power station. The locations chosen were the Lasem and G. Muria areas. NIRA earmarked \$1 million; technical experts; facilities and equipment.

There were no objections or obstacles facing the choice of location. However, several qualifications and terms must be met before construction can begin. These conditions include population distribution, climate, tides and weather. Seismological and volcanic aspects must be studied more thoroughly. The G. Muria and Lasem areas must be free of earthquakes and volcanic activity.

The layman interprets positive conclusions as signaling the start of construction, which has been on hold for some time.

However, experts, who understand the complications of such problems, are not as certain. Since 1976, Budi Sudarsono, a BATAN technical expert who headed the nuclear power station feasibility study project, has expressed the opinion that the uninformed can discuss the possibility of constructing Indonesia's first nuclear power station in the mid-80's. He is now head of the Bureau of Management of Radiation and Radioactive Materials, and also chairman of the core team for the nuclear power station project.

The BATAN-NIRA report went to Energy and Mining Minister Subroto in 1981. Through the newly-formed National Energy Coordinating Body, the government indicated that construction would be delayed to at least 1984.

But this does not assure that the nuclear power station will be built. Studies continue, especially micro-seismic studies. The results of those surveys may change the reports sent over the past 2 years. Experts believe that the Muria-Lasem area is free of seismic or volcanic activity.

The National Energy Coordinating Body's Energy Resource Technical Committee sees no obstacles to the construction of the nuclear power station, but the National Energy Coordinating Body apparently thinks otherwise.

The intent to build a nuclear power station is not a new departure. Since the early 1960's, following the creation of the Triga Mark experimental atomic reactor in Bandung, Indonesian experts had discussed the possibility of using nuclear power to generate electricity.

The Director General of BATAN, Dr Siwabessy, has, on several occasions, discussed the construction of a nuclear power station with a capacity of 100-200 kilowatts. The cost would be around \$200 million. Those figures are about 15 years old; they could not be approached today. Despite this, Indonesian atomic experts have not abandoned the idea.

There are many conditions which must be fulfilled to permit economic operation of a nuclear power station, including the fact that the electric power capacity must be in line with the capacity of the nuclear power station.

At the end of the 1960's, electric power capacity in Indonesia was no more than 1,000 megawatts. Building a nuclear power station with a capacity of 200 megawatts at that time would have been to equip a body with an outsize head. This would disturb the stability of the electric power system.

These factors, among others, caused Indonesian energy experts at the end of the 1960's to postpone serious discussion of a nuclear power station until electric power needs in Java, at least, were more in line.

However, after 10 years, the problems were different. The price of components, services and raw materials had jumped to several times their level 10 years earlier. One could no longer talk in terms of a small or moderate sized power station. The smallest nuclear power station deemed able to operate economically would have a capacity of 600 megawatts. The price of \$200 million for a 200 megawatt station quoted at the end of the 1960's no longer has meaning.

Nuclear technology, particularly nuclear power station technology, is highly advanced. This means the cost has jumped to billions of dollars.

The situation prompted the proponents of a nuclear power station to press harder for accelerated use of nuclear power to generate electricity. They wanted Indonesia to set a goal of 25,000 megawatt electric power capacity in Java, by the year 2000. This target could not be achieved without using nuclear power.

Proponents of the nuclear power station believe that among the alternatives to oil, nuclear power is best able to end the energy shortage by the year 2000. There are no technical obstacles, or lack of skills or abilities to delay the construction of the power station. According to atomic energy experts, construction must start now, if we want to enjoy nuclear power-generated electricity by the end of the century. It depends on the political will to decide whether or not to build the station.

There is no inclination to reject the nuclear power station, but the construction must be considered in connection with various technical and financial problems.

The majority of these problems are political, among them the selection of foreign contractors; the problem of disposing of nuclear waste; the problem of nuclear non-proliferation; and fears of leakage from the reactor. The leakage from the Harrisburg reactor in the United States in 1979 has influenced many nuclear power station projects, including both those under construction and those being planned. Several projects in the United States and Europe have been delayed because of that event. Supporters of nuclear power claim that the risk of leakage or accident is not great. Moreover, there are far greater risks for other kinds of accidents, such as airplane or traffic accidents. But studies conducted by American experts after the Harrisburg incident show that the risks involved in a nuclear power station are real.

The problem of disposal of nuclear waste in a country which operates nuclear reactors has never been satisfactorily resolved. It can be buried in the ground around a project, or stored in abandoned salt mines, or disposed of on uninhabited islands.

There is also the question of the Nuclear Nonproliferation Treaty (NPT), which Indonesia signed. The NPT was signed by more than 100 nations who agreed not to use nuclear knowledge and facilities for military purposes. The NPT came about in the early 1970's, after India exploded an atomic device which could have enabled that nation to develop nuclear technology for military use. That capability is said to have been developed thanks to facilities provided by Canada, among others.

Several nations, including Brazil, Argentina and Israel, refused to sign the treaty because they felt it was unfair. There is an impression that the nuclear club, notably the United States, is trying to limit the nuclear capabilities of non-nuclear nations. Nuclear reactors can produce plutonium, a raw material in building atomic bombs. Because of that, non-nuclear nations which do not have nuclear weapons must agree not to use nuclear technology to develop nuclear weapons.

The treaty also influences the chances of building nuclear power stations in developing nations who wish to use nuclear energy to generate electricity. Purchasing nuclear components is not as easy as it was 15 years ago. Now, nuclear nations reserve the right to insure that the facilities they sell for peaceful use will not be used to develop nuclear weapons. This control is very harsh, since it denies the non-nuclear nations the opportunity to learn from the nuclear nations.

Indonesian nuclear experts believe we were correct in signing the treaty, and should abide by it. Besides that, producing plutonium requires advanced technical facilities and skills which are not easy for developing nations to acquire at present. Because of this, the market for nuclear power stations has slackened.

In the past, non-nuclear nations relied on the United States to supply nuclear components. Now, they must turn their attention to other nuclear nations which do not demand as close supervision of nuclear facilities and nuclear technology. The Triga Mark reactor in Bandung was built with American cooperation. But

the multipurpose reactor which will be built in Serpong in 1984 will have West German participation, according to BATAN experts.

That reactor, with a capacity of one megawatt, is intended primarily for experimental use. There are no plans to use it to generate electricity, or, above all, to develop the materials needed to build nuclear weapons.

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CSU: 5100/8108

## BRIEFS

AGREEMENT ON PEACEFUL NUCLEAR COOPERATION--Minister of Mining and Energy Prof Subroto has signed a cooperative agreement in the field of peaceful uses of nuclear energy, in the course of a 5 day visit to Canada. The signature of the agreement, which took place in a Canadian government building on Parliament Hill, Ottawa, on Monday [12 July], was witnessed by representatives of the two countries and was presided over by Canadian Secretary of State for External Affairs Dr Mark MacGuigan, on behalf of the Canadian government. Dr MacGuigan expressed his pleasure at the agreement reached by the two countries in the cooperative effort in the nuclear field. He went on to express the hope that Canadian-Indonesian cooperation in the development field will continue to be strengthened. Minister Subroto in his reply stated that in the framework of nuclear energy development the Indonesian government had signed the same kind of agreement with the United States, France, Italy, Japan, and India. With the signature of the agreement with Canada, which has considerable potential in the nuclear energy field, it is hoped that this action will help the Indonesian government in its efforts to increase the development of nuclear energy through the exchange of information, personnel training, and transfers of technology. [Excerpts] [Jakarta SINAR HARAPAN in Indonesian 15 Jul 82 p 12]

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CSO: 5100/8108

## QUANTUM JUMP IN NUCLEAR HIGH TECHNOLOGY DESCRIBED

Warsaw ZYCIE WARSZAWY in Polish 29 Jul 82 p 3

[Article by Bozena Kastory: "A Polish Nuclear Fuel Patent]

[Text] This is the story of the patent. It is sufficient that the Italians are selling two industrial installations built in accordance with a Polish idea, and the money spent on this work by the IBJ [Institute of Nuclear Research] will be paid back in its entirety over a period of a dozen years or so. It is not that the patent holders received several thousand dollars each. "The concern is not about money," states Prof. Przemyslaw Hoffman, director of IBJ Department XXII. "It is the satisfaction that we can compete with the world's industrial giants. And compete in what? In equipment for nuclear energy, specifically the regeneration of nuclear fuel. They have several dozen nuclear power plants; we have none. When extractors to regenerate nuclear fuel were built at the IBJ, it was necessary to test them under high-activity conditions. But in Poland hot cells were actually eliminated from the investment plans, and it was not possible to check out the extractors."

"Who should we approach? Those who produce nuclear fuels such as the United States, England or France--do not permit foreigners to participate because of state secrets, military affairs and the like. In the field of nuclear fuel regeneration, the IBJ investigates cooperation with foreign institutions, but expanding research on extractors was limited by the size of available experimental installations. The smallest extractor developed by the Polish team has a regeneration capacity of 3 kg of nuclear fuel per hour. Is that much? It is very much. The disintegration energy of one gram of uranium-235 isotope corresponds to 1 megawatt-day or 1 million watts for an entire day. That much just from one gram of fissionable material! But the smallest-capacity extractors developed by the IBJ can regenerate 3 kg of spent fuel per hour which contains not 1 but 10 grams of the fissionable uranium-235 isotope and about 6 grams of plutonium-239."

"We began searching abroad for the industrial capability to test our extractors. Two potential candidates, the FRG and Italy, replied. We selected Italy because I first began work in this field in 1967 during my stay of several months in Italy. An agreement was signed between the then existing UEA [Nuclear Energy Administration] and the National Committee on Nuclear Energy in Italy."



Why do we make equipment to regenerate fuel when we do not have a single nuclear power plant?

First of all, when Professor Hoffman and his people started their work Polish programs projected that Poland's power industry would develop much sooner. In addition, coal resources would not last too long. In the 1990's we will have to obtain energy from uranium. However, by that time the world will be exploiting secondary deposits which are now considered to be unprofitable; such deposits contain no more than 0.1 to 0.2 percent uranium.

In the meantime, in the spent fuel from nuclear power plants about 92 percent of the uranium as well as several grams of plutonium for each kilogram of fuel used is left behind. This is a specific of nuclear reactors as opposed to conventional oil- and coal-fired power plants where all the fuel is burned in one cycle. In a nuclear power plant, 98 percent of the fuel remains in the spent fuel. It should be regenerated, that is, the uranium and plutonium should be separated from the products of fission in order to return the fuel to be burned again. The separated products of fission are radioactive wastes, dangerous to living organisms. They simply cannot be thrown away, thrown into a river or dumped into the ocean. They must be stored in special containers for several years until they cool down, that is, until the short-life radioactive elements decay. Long-life elements will remain at any rate.

Transporting spent fuel to regeneration plants in densely populated Europe is dangerous. It would be best to regenerate them on site. Of course, this is not easy to do. If it were easy, everyone would be doing it now. The very high activity of the spent fuel makes it difficult to extract the uranium and plutonium. Thus it is necessary to conduct operations at a distance, remotely controlled, using completely reliable apparatus because direct human intervention is not possible. One must "breed" robots coupled to electronic brains which could operate within a hot cell, something no living person can do. These robots will have to evaluate the situation, make a diagnosis, make a decision and operate in these cells.

To what extent is the IBJ involved in this work?

"We developed a concept," states Professor Hoffman, "for a two-stage fuel regeneration process. The first, hot stage for regenerating fuel, that is, dissolving it in acid and extractively separating the uranium and plutonium from the products of fission, would be conducted on site at the large electric power plants. Then the uranium and plutonium mixture would be transported to a central plant where the uranium and plutonium would be separated out under international control. Why can they not be used again by the same nuclear power plant? Because they contain plutonium from which nuclear bombs are made. So long as plutonium is mixed with uranium it cannot be bomb material. Plutonium by itself is bomb material.

"At the IBJ we are involved with the first, hot stage of regeneration. We are developing flow-line production equipment, control components and automation equipment. Thus we made the original equipment to dissolve the fuel as well as a whole family of extractors to separate the uranium and plutonium



from the products of fission. The smallest extractor, as already mentioned, has a production capacity of 3 kg of fuel per hour, and the largest has a capacity of 200 kg of fuel per hour. These physically small devices have very large capacities and phase contact time is much shorter than in devices used to date. Thanks to their small size, there is no danger of exceeding the critical mass or of an uncontrolled explosion. Miniaturization of these devices decreases the cost of the very expensive concrete shields. The amount of active solutions in the devices also are decreased greatly, and thus the danger of contaminating the environment in case of failure is also decreased.

"Control is another matter. Ordinarily, the analytic control used in slowly occurring processes proceeds as follows: first, a sample is taken, it is then placed in an analysis chamber where the uranium and plutonium contents are determined. With fast processes, however, this would be only a record of what was, without the possibility of affecting the process. On-line control is needed here. Therefore we developed an on-line control device to determine the uranium and plutonium in solutions before and after extraction. Everything will be automated. Data will be processed with the aid of micro-processors.

"You ask, what projects are near completion? We are on the verge of completing the extractors. An entire battery is ready which will be installed in hot cells in plants in Trisaia, Italy. It will be a test--1,000 hours spent regenerating fuel. After this test, the extractor will become a commercial item. The Trisaia plant is specially designed for such testing. It is very adaptable, it has the capability of modifying specific equipment while in operation. Allowing us into the plant is a great opportunity for us. Our people are being trained in the best plants. But what about our intellectual input? Did you know that the Italians are spending \$20 million for this purpose. From our side it is mainly the technology that is worth the money. Tests have already taken place at the Trisaia production flow-line facilities with uranium and thorium. All theoretically possible accidents and how to avoid them as well as a full cycle of investigations were also conducted for the safety report."

The IJB Department XXII team is the author of the patent. The concept and initial development are Professor Hoffman's. Then came the implementation and improvements. During the course of the project, modifications were made jointly with the Italians. The Polish patented equipment will be jointly patented with the Italians because of the many important modifications. They will be produced in Italy.

Is this better or worse for us?

"We could not manage to do it by ourselves. Many materials needed for production and for operations in hot cells are included in the embargo. Now the Italians are waiting for the arrival of Polish specialists to place the Polish extractors into operation in the Italian hot cells to regenerate spent fuels in the Trisaia plants. With each installation sold by the producer,

5 percent of the proceeds goes to Poland and 5 percent to the Italians. There are willing buyers. There are several such extractors in the world to regenerate fuel. The Polish one is the simplest and thus the most reliable.

"It is not megalomania," states Professor Hoffman. "One cannot learn about equipment, one has to have a feel for it. I was born in a factory. My father also spent his entire life in factories. I have worked with machines for many years. I understand them, have a feeling for them. I am not ashamed to say that machines and equipment are my passion. In the 1950's I directed the team that developed the granulated superphosphate technology. Later, in Tarnobrzeg, we developed the technology for sulfur modification, flotation and smelting. And when work started at the IBJ on applying radioactive isotopes to investigate industrial processes, I was asked to participate in the work. Then I was asked to organize a laboratory which would be involved with nuclear-fuel regeneration. This process requires equipment of the highest technology--it must be reliable and sophisticated, and that is what attracted me."

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## REPORTAGE ON NUCLEAR ENERGY POLYTECHNIC

Havana BOHEMIA in Spanish 27 Aug 82 No 35 pp 12-15

[Text] It is 0900 hours in the morning of a working day of the school week. The Cienfuegos Nuclear Energy Polytechnic appears to be empty, but that is not so. The fact is that all the students are in the classrooms or laboratories, zealous and dedicated to the study that will train them as intermediate-level technicians or skilled workers for the first Nuclear Electric Powerplant (CEN) constructed, also in Cienfuegos, and will increase considerably the production of electric power in our country. This plant requires highly qualified personnel to put it into operation.

We break the silence with a "hello" to the comrade receptionist, promptly informing her that we are reporters from the magazine BOHEMIA and that the director is expecting our visit.

"Please come in," she tells us. We follow her along the corridor leading us to the director's office. We enter.

Anaury Galindo sits up, greets us and when we are seated, asks us: "Were you familiar with this school?"

"I was," I tell him, "at the end of July we visited the construction work being done here in this province to build the CEN and the other structures completing the nuclear electric complex, including this polytechnic."

"Do you have any plan with you?"

"Not exactly."

"All right, let's make a tour. What do you think of it?"

"Splendid."

"Wait just a moment, I am going to notify the Soviet adviser, Comrade Anatoliy Cherbakov."

A few minutes later, Anatoliy arrived. We met him on our previous visit; he has been in Cuba for 3 years. When he recognized me, he could not restrain the desire

to convey his happiness to me with a tight embrace. Anatoliy is a Soviet who has "gone native," as we Cubans put it; he loves Cuba dearly, and is happy to be on a par with his working comrades, as well as the students, attempting to offer them, on every occasion that arises, his knowledge and experience.

The Cuban instructor, Jose Antonio Cisneros, has come with him.

Anatoliy tells us: "Cisneros set up the Armando Garcia Aspru Energy Polytechnic, where he is an instructor, and an electronics laboratory just like this one here. He is always asking me: 'What more should I do?' What he has done seems like little to him. When I came here to Cienfuegos (he knew I was), I decided that my counterpart should come also. He has done his work very well, and, in addition, he directs the workers at the ECOI [Industrial Projects Construction Enterprise], where he set up a substation shop alone, without any help. He is very modest: he does not speak Russian, but he understands me very well. He is an excellent instructor of future instructors."

#### A Pleasant Surprise

The tour took us about 3 hours. The same disciplined atmosphere of quiet notice taken of our arrival were maintained wherever there were students and teachers.

We received a pleasant surprise when we observed several girls among the boys. We turned to the director and told him that we had been impressed with this fact, because we in Cuba did not have a tradition of technical personnel working in the electric powerplants.

He replied: "The interesting part of our enrollment in this special polytechnic is that there is no discrimination against women. They are capable of performing nearly all the tasks that were only assigned to men in the past. The revolution has given women the same rights and obligations as their male comrades have, and they are contributing equally to the construction of the socialist society, insofar as their physical and mental capacities allow. We have female comrades who, upon graduating, will share with their male comrades the responsibilities for the operation of the powerplants that are to be built.

"We also have students who were demobilized from Active Military Service. Some of them are being trained as intermediate-level technicians, and others as skilled workers. Those who study the special subjects of electrical maintenance, boiler mechanics and turbine maintenance mechanics enter on the ninth grade level and, upon completing their studies, receive the certificate of a skilled worker. Those studying assembly, operation and repair of steam generators and nuclear reactors, and instrumentation and automatic control, must enter at the ninth or twelfth grade level, depending on whether they study for 1 year, 2 years or 4 years, and in accordance with the special subjects taken.

"Because of the nature of this center, we do not hold emulation with other plants; the emulation is internal, and the 'checkups' are held on the last Wednesday of every month, with students and teachers participating. If you stayed until tonight, you would witness something unusual concerning the desire to learn more.

these young people, especially those demobilized from military service. We have to tell them to rest and go to bed, because many of them, absorbed in reading, analysis and the performance of their tasks, would remain studying until dawn if we let them.

'That is good,' we tell them; but we emphasize that they need to rest in order to compensate for the physical and intellectual exhaustion which occurs during the day. We also tell them that we have a night schedule, like the daytime ones, that we must observe.

'They are terrific; they know the work that they must do, and they finish it. In September, we took over the school without the completion of the planted areas. But it was no problem. From the first week of classes, they stuck to the work, and you can see how green the lawns are, and how the trees and shrubs are growing. They bring the plants themselves, and we even have cactus, which grows easily here. Until we have an irrigation system, which is in the process of being provided for, the areas will be irrigated with one bucketful after another, or as best they can. Each group takes care of its plot, and they hold emulation with each other.'

Calindo noted in conclusion: "This polytechnic will meet an immediate and future need for the development of electric power. We, the students, teachers and non-teaching workers, are aware of that fact. Our motto is: 'The peaceful use of the atom, a task of socialism.'"

We take advantage of a break in the activities between the morning and afternoon sessions. The assistant director of boarding and secretary of the party cell, Gilberto Fuentes, explains that the boarding system does not pose any problems with these students. "They are ideologically trained, but we intensify that aspect, because they are young people who, when they enter production, will have to participate in jobs marked by very great responsibility. The disciplinary standards run parallel with their academic and technical learning, and compliance with them is demanded by the party, UJC [Union of Young Communists] and Leadership Council.

The union's work is critical and analytical for each of the problems posed. The instructors exceed the regular work schedule and do so with a genuine revolutionary spirit.

'Some of them are young, which is why it is essential to concern ourselves with their political training, just as we do with the student body.

Everyone considers this to be something of his own, and they all take care of it, with the hope that it may be the best in the country. The party is helping and encouraging us, and the first secretary for the province, Comrade Humberto Miguel Fernandez, is doing so with particular concern."

According to Silvia Riveron, the best non-teaching worker (receptionist, clerk, typist and supplier, because she works wherever necessary), this school is an interesting experience.

I have just begun. I had never worked; I came as a volunteer, and as you can see they selected me as the best worker. I don't know what merit I have for that."

The director interrupts her and remarks: "Your record was analyzed exhaustively, like that of the other comrades, and we found that you were fulfilling all the indexes to completion, and that you excel in your preparation."

Silvia adds: "It is my desire to serve the revolution, now in this school, or wherever it may be."

Areli Suarez, another non-teaching female worker, has a 10th grade education, like Silvia. She keeps track of the students' documentation, and deals with their problems. She also has other duties in the teaching secretary's office.

We ask her: "What do you think of this new school?"

"The revolution has been building many very good schools. This one has special features, and its graduates will have to be very useful in something as all-important as nuclear energy applied to peaceful uses."

#### What the Students Think

Pedro Garcia Cabrales, who has been demobilized from military service, is studying the specialty of intermediate nuclear technician; he has been nominated for the Internationalist Services Medal, for his participation as a fighter in the fraternal republic of Angola. Invited to the Fifth Congress of the UJC (Federation of Middle School Students), he is the organizer of the UJC Committee at the school.

"Pedro is one of our best comrades," stressed FEEN Chairman Juan Carlos Diaz Pacheco, who is also a guest at the student function.

The instructors, Nelson Machin and Antonio Rey, for their part, added: "He is the most outstanding student in the school: in study, work and responsibility."

The internationalist youth remarks that he studied at the Workers and Peasants Faculty and, when he was offered admission to this polytechnic, he did not have any doubt of its importance.

"We saw the opportunity, and we are here. When I finish the course, I am going to apply my learning at the Cienfuegos CEN; but as I said 5 years ago, if I am needed in another country, I shall go there."

"How much is your average in your studies?"

"Over 91 percent."

"Would you like to say anything else?"

"I urge the youth to take advantage of the opportunities offered them by this center. I would also like to say that all of us back to their final consequences the statements of our commander in chief, denouncing to the world the provocations and threats of fascist President Reagan against Cuba, Nicaragua and the countries of Central America and the Caribbean."



Another student with a good academic rating, Juan Antonio Castillo Chirino (with 98.95 percent promotion), a future intermediate nuclear technician, thinks that this is a career with great prospects for the youth, owing to Cuba's scientific and technical development and the building of atomic powerplants.

Julian Suarez is a continuing student. He began at the Juan Manuel Castineira Energy Polytechnic, in Mariel, and later continued at the 5 de Septiembre, in Cienfuegos. Now he is taking the third year of studies.

"What do you think of this speciality?"

"Besides its future, I sincerely admit that it excites me, although I realize that it is not an easy specialty; you have to devote time to it. But, with 2 hours of individual study every day, continuously, I shall not have any problems. What one must not do is wait until the end."

"Do you think that you can maintain the average?"

"I would like to improve it. I also think that one must continue to do better, because later, on the job, we shall have to intensify our work in practice; don't you think so?"

To Know, Not to Pass

At this polytechnic, based on the decision of its students, one studies "to know, not to pass."

The phrase at the heading of this article is not a mere promise. It cannot be such for those who maintain the maximum attention that could be demanded in the activities in which they participate; and, later, at night, engage spiritedly in study, without caring that the hands of the clock are spinning, devouring hours and minutes stolen from refreshing sleep.

All the teaching personnel have degrees. Nevertheless, the teaching cadres do not neglect to improve the subject matter for which they are responsible: Some give courses in general training, and others are in charge of the special fields. Nuclear engineers provided by CEN and Soviet advisers work there, as well as administrative workers.

In accordance with the goals of the socialist countries, Cuba will use the atom for peaceful purposes. The work at CEN is progressing. The training of engineers, specialized technical cadres and skilled workers is progressing as well.

The Nuclear Energy Polytechnic might be called the first link in the nuclear effort that the Cuban revolution is promoting, not to destroy human lives nor to demolish cities, but rather for our country's economic and social development, and to guarantee the happiness to which every person is entitled as soon as he plants his feet on the face of the earth.

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## BRIEFS

NOMINATION TO IAEA GOVERNORS BOARD--Vienna, Dhulmijja, 25 Sep, Jamahiriya News Agency--The Jamahiriya has been nominated to the governors board of the International Atomic Energy Agency during its 26th session currently held in Vienna with the participation of 94 countries. This move is an acknowledgment of the Jamahiriya's efforts in nuclear energy. The Jamahiriya was representing the African group which unanimously nominated the Jamahiriya. The governors board is the highest executive authority of the agency. The secretary of energy headed the Libyan delegation to the conference. [Text] [LD251438 Tripoli JANA in English 0855 GMT 25 Sep 82]

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NUCLEAR RESEARCH AT RISE FACILITY NOW MATTER OF SECONDARY IMPORTANCE

Copenhagen BERLINGSKE AFTEN in Danish 27 Aug 82 pp 1, 11

[Article by Kirsten Mikkelsen]

[Text] Windmills flourish around the research station at Rise which, after a sharp change of course within the last few years, has become Denmark's large energy research center. Only 16 percent of the resources are spent on direct nuclear-power-oriented studies. A total of 1,000 people are today employed within a number of widely diversified areas--from coal burning experiments to international fusion research at Rise, which makes up for constant budgetary cuts by undertaking research under contract for the industrial sector.

The Rise research facility has emerged from its scientific isolation and has expanded its area of research to a degree which a committed nuclear researcher 10-15 years ago would have only imagined in a nightmare. In the light of the political decision to postpone the Danish decision-making on nuclear power and the adoption of the proposal to work out an alternative energy plan without nuclear power, Rise has of late years changed its course sharply and has changed the priorities of its research activities. From operating from a nuclear base, the research facility has become a modern energy research center.

Rise's landmark is no longer the nuclear reactor which, on 15 May of this year had been in operation for 25 years with a consumption of uranium of less than 1 gram for its operation. What first catches the eye of a visitor is a number of small windmills of many different models which the breeze from Roskilde Fiord makes turn. The legislators as well as the management and the researchers have taken the consequence of the fact that Denmark is not just about to give its "Yes to Nuclear Power."

In the course of 1981, a re-evaluation of all nuclear research and development programs at Rise, including reactor technology and reactor safety, fuel circulation and environmental and general safety research, was carried through. Reactor technology and nuclear technology accounted for 42 percent of the total budget of 242 million kroner. The re-evaluation showed, however, that only 16 percent of Rise's resources goes to work which aims directly at the introduction of nuclear power in Denmark.

The difference arises because many areas are not used only within nuclear research. By way of example, meteorology may also be used in the research into environmental problems, wind power, effects of winds on bridges, etc. An activity such as structural mechanical construction and the design of pressure tanks may also be used, for example, in district heating

The managing director of Riss, Niels E. Busch, Licentiate in Engineering, replaced Niels W. Holm last spring when the latter became chief of the Steel Rolling Mill at Frederiksværk. Busch, who goes in for openness to such a degree that "the windmill station is about to be crushed under the weight of visitors who come to see it and to get advice," says on the question of the different percentages for nuclear power research that this is a matter which is extremely difficult to decide, but the work we perform is the same.

### Research Under Contract

Riss was set up for the primary purpose of performing research on the peaceful use of nuclear energy. When the Nuclear Energy Commission was abolished in 1976, the secretariat re-emerged as the Energy Board, and Riss got a board whose chairman is the former chief of the Budget Department, Erik Ib Schmidt. At the same time, the objectives of Riss were changed.

In addition to "performing research, development work and advisory activities of importance for the use of, and the control with, nuclear energy for peaceful purposes," the research facility may also "by virtue of its equipment and its capacity perform research and development activities in the general energy field." In addition, the research facility may "undertake problem-solving tasks within these areas on behalf of public or private orderers."

Research based on contracts obtained in competition with others does, indeed, take place to a steadily increasing degree. This year research is performed partly--approximately half of it--under the research program of the Ministry of Energy, partly on the basis of commercial contracts for a total amount of 50 million kroner. These amounts compensate for approximately 10 years of direct cuts under the Appropriations Act. Cuts which have made the budget approximately 20 percent less from what it would have been if general projections had been made.

Niels E. Busch tells WEEKENDAVISEN [weekend edition of BERLINGSKE TIDENDE] that they are working toward a diversification of the research tasks undertaken under contract. "The contracts with, and the work for the industries inspire us and provoke new thinking among us."

### Frustrations

Riss has reduced its nuclear research activities as far as is possible considering the obligations of the research facility to the Folketing and the taxpayers. Should it be decided to introduce nuclear power, Riss still has got an adequate amount of readily available know-how and the basis for a rapid reorganization. However, a number of researchers who for years have been working to perfect their knowledge of nuclear technology "but have constantly seen nuclear power vanish beyond the horizon like a white elephant," as Niels E. Busch puts it, feel some degree of frustration.

Knud Møllenbach, secretary to the management, says that a few colleagues from Risø had switched to the nuclear research department of Elsam [organization for coordination of electric power in Jutland and Funen], which is now also dragging on a languishing existence, but are today either working abroad or are utilizing their expert knowledge at Risø in other areas, and they find this inspiring. By way of example, researchers who have been working on the reliability and safety of nuclear power plants may today use their knowledge in chemical processing plants, natural gas systems, off-shore facilities, even at the chlorine works at Bryggen.

#### Royal Theater of Research?

Niels E. Busch says that Risø has changed from being an isolated "national laboratory" (as it is called in English) in relation to the rest of the research and higher educational world and Danish industry to covering a very wide energy spectrum. However, the managing director stresses that even if the course has been changed, it has, in the process, at any time, been the most appropriate one.

At no point has Risø departed from the continuity which by some people has been interpreted as inertness, energy, and conservatism, but which is necessary because one all the time builds on one's experience. There is a limit to how quickly one may change the objectives of a serious research institute. A solidly working group of researchers may be built up in 5 years whereupon it takes still some more years before it has become internationally accepted and recognized, Busch points out.

A research plant such as Risø not only has got a strategy but has also got many functions of a technical nature. Niels E. Busch points out that if Risø has been referred to as "the Royal Theater of Danish research," the intention may not have been kind, but it is not entirely wrong. What would the Danish theater be without the Royal Theater? he wonders. Whether Risø, the Niels Bohr Institute or other facilities are the foremost research institutes of the country not only depends on plans and good ideas, the most important thing is having good researchers. If it had not been for Niels Bohr, Danish physics would, for example, have looked entirely different today.

While in the process of metamorphosis, Risø has been accused of making predatory descents into energy research areas which with respect to control, grants, and research have already been placed with other institutes, and several politicians have expressed their concern that Risø is absorbing vast research funds.

One of the critics, the energy policy spokesman of the Radical Liberal Party, Lone Lybkjær, civil engineer, tells WEEKENDAVISEN that one must be careful that Risø does not get a monopolistic position. She says that the entire energy research situation, including the new role of Risø, should be taken up for discussion. "They not only draw the funds which they have under the Appropriations Act, they also draw funds in the form of other tasks. The result is that it becomes more difficult for other research institutes and new initiatives to get a chance."

In reply, Niels E. Busch says that if one thinks in terms of "small is beautiful," some people may perhaps feel threatened. But we are composed of a number of smaller units. A central leadership cannot plan the technical work which takes place in so many different areas.

According to the Ministry of Energy's energy plan EP-81, 32 percent of the energy research and energy development of the public sector takes place at Risø. The managing director of Risø does not find that figure correct. "Research is going on at the universities and institutes of higher education which is of fundamental and essential importance," he says. "A large part of the resources going to that work have not been included in the total energy research budget."

Niels E. Bush, moreover, does not agree to the figure to which the 32 percent corresponds, viz. 46.9 million kroner. He says that it is a question of magnitudes which cannot be compared. One of the contributing factors is the fact that there is no free research but planned research aimed at certain objectives at Risø.

#### Energy Economics

The working program of Risø comprises the study of how to best utilize the different forms of energy, for example fossil fuels, uranium from the Kvanne Mountain in Greenland and wind energy. Risø is also studying how to store and transport energy, and how Denmark may best combine the different resources of energy that are available.

Risø is working on a new technique which converts waste heat to power by using natural gas to operate a heat pump. Within the area of environmental chemistry, they work, among other things, on coal burning, and in a department set up 5 years ago they are working on energy economy models for planning. Via data-processing, it is, for example, possible to calculate the power consumption in the coming years under different conditions, and the models may, moreover, evaluate what might be the most reasonable use of the natural gas from an economic point of view.

Hans Larsen, licentiate in engineering, who has taken over the energy systems group after O.W. Dietrich, D.Phil., who is today the chief of the planning office of the Ministry of Energy, says that the group makes national and international studies, including a study on the technological development within the energy sector after the turn of the century.

"We seek to isolate the areas of the technological development which may affect power, natural gas and district heating in Denmark. Areas in which decisions will have to be made already in the eighties." The introduction, if any, of fusion energy in the twenty-first century also forms part of the considerations. Other Risø researchers participate in the joint European fusion research program. The energy system group also develops EDP models for use in the work of the EC Commission with prognoses and the planning of energy and economic policies.

Some of the 1,000 employees at Risø are involved with agricultural research which in some areas may be considered to belong under energy research. This

applies, for example, to research on leguminous plants. The use of nitrogenous fertilizers corresponds to one-fourth of the country's total energy consumption and is the largest individual item of the energy accounts of Danish agriculture. Cultivation on a larger scale of leguminous plants will reduce the need for oil and natural gas for the production of nitrogenous fertilizers and, at the same time, increase the domestic production of vegetable protein. In this area, as in so many other areas, the researchers at Risø have got an eye for the great possibilities inherent in small things.

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